Canada Mortgage and Housing Corporation

Société canadienne d'hypothèques et de logement

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A STUDY OF URBAN LAND SUPPLY MANAGEMENT INSTRUMENTS IN CANADA

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REPORT PREPARED FOR

RESEARCH DIVISION

Canada Mortgage and Housing Corporation

BY

DCH Consultants Inc.

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1.0 INTRODUCTION

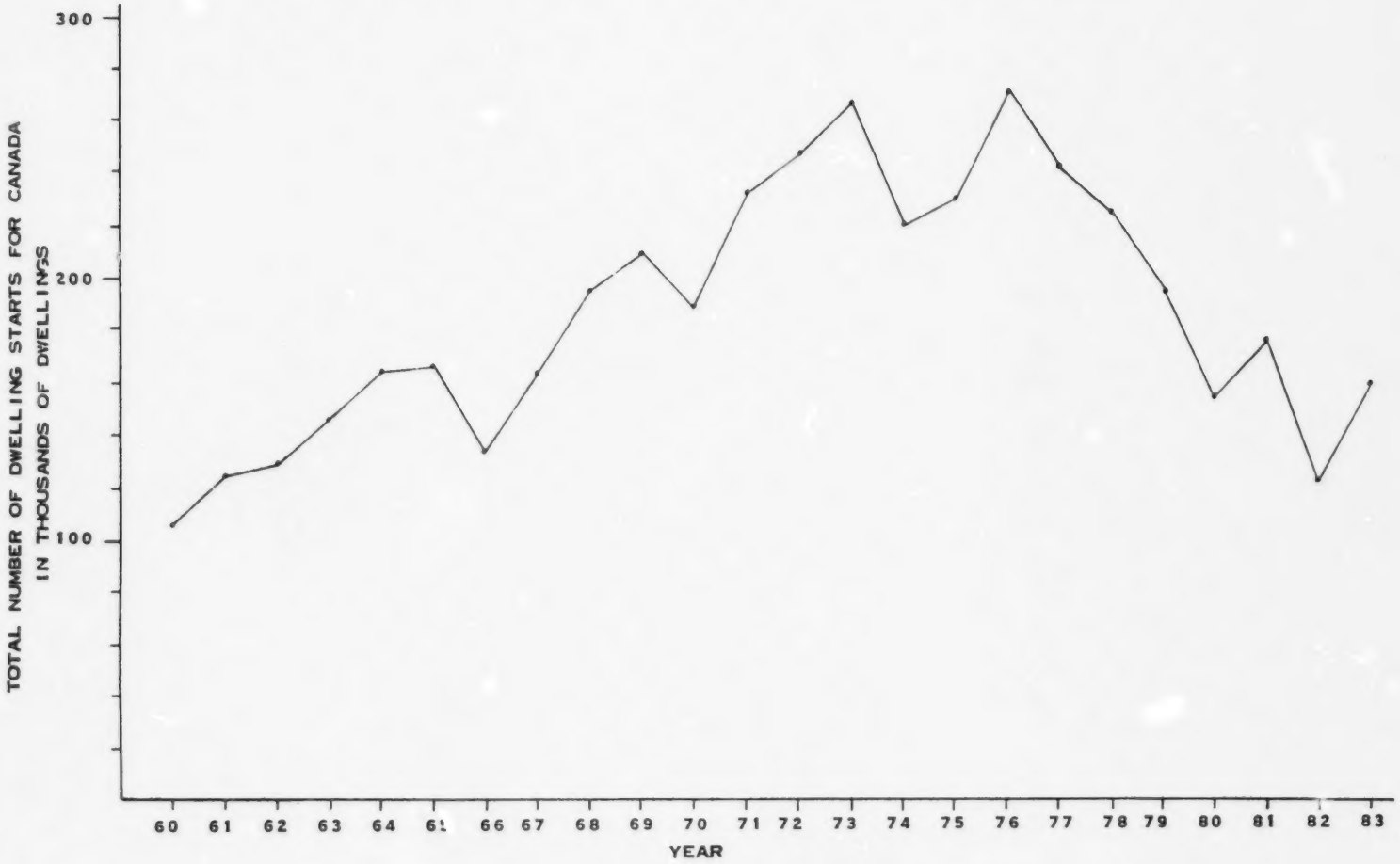
Urban centres in Canada characteristically require a large, structured and serviced environment to support the concentration of population. Serviced land for urban residential land development is created when market demand propels developers and infrastructure planners to move residential subdivision projects from planning to development. Each element of change in the land development process is very expensive, it is therefore important that the extent of land use change be executed as closely as possible to market requirements using appropriate land supply management instruments.

For the public sector, the most complicated management problem in urban land development is the supply of infrastructure (sewer and water services). Owing to the scale, and therefore high cost, of infrastructure projects and the concomitant lead time required to install the services, the inventory problem facing municipal authorities is not easy. An over projection of demand would mean high carrying costs, while a low rate of supply would result in shortages.

During the last two decades, Canada has passed through periods of sustained growth and only glimpses of decline in dwelling starts, as shown in Figure 1. As a result of the sustained demand for new housing from 1968 to 1977, many municipalities had invested heavily in sewer and water main projects to provide infrastructure for future urban development. In many places the servicing capacity is now approaching

FIGURE 1

TOTAL NUMBER OF DWELLING STARTS IN CANADA
(1960 - 1983)


TOTAL NUMBER OF DWELLING STARTS FOR CANADA
IN THOUSANDS OF DWELLINGS
300
200
100
60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83
YEAR

SOURCE : CMHC, CANADIAN HOUSING STATISTICS 1983.

depletion. In other cases, where over projections have been made, the significant drop in the take-up rate over the last five years has resulted in the services standing grossly underused. In Durham, Ontario, for example, it is reported that "the region has built enough water and sewer services to accommodate more than half a million people, (which is) about double its current population and slightly more than what it expects in the year 2000" (Daily Commercial News, February 18, 1982).

Canada Mortgage and Housing Corporation has projected that future development of ground housing units will be more deliberate than in the 1960's and 1970's because of declining numbers of households in the market for new housing. It is estimated that there will be a drop of 41 percent in ownership requirements from 123.6 thousand units per annum in 1981 - 1986 to 72.6 thousand in 1996 - 2001 (Brown, 1981).

While various instruments have been employed to manage urban land supply, they have often not been applied in concert. This is because land supply management has been a secondary goal in the planning and installation of infrastructure, and in regulating subdivision development. In addition, documentation of the nature and use of the instruments are often compartmentalized within groups of practitioners (municipal planning and works departments, assessment departments and public land developers) and research groups (universities).

The purpose of this study is to review the various instruments that have been employed or proposed for managing the supply of urban land in Canada, and to determine the circumstances under which they have been or can be applied. The scope of the study does not extend to determining the suitability of the instrument(s) to the various jurisdictions. The study is undertaken with the objective of bringing together knowledge on the instruments of urban land supply management into a document for urban land policy discussion.

The objectives and approach of the study are defined in Section 2. Section 3 presents the process of land development, the functions and objectives of the land supply management systems and the supply management instruments. In Sections 4 through 7, the respective land supply management instruments are described and evaluated. Finally, in Section 8, the main conclusions of the assessment of the use of instruments for an urban land supply management system are summarized.

2.0 STUDY DEFINITION

2.1 Study Objectives

The four objectives established for the study are as follows:

(1) to identify existing instruments used for land supply management;

(2) to examine land supply management instruments and determine the circumstances under which they have been applied, from a review of relevant literature;

(3) to evaluate the effectiveness of each instrument and identify major weaknesses in the use of the instrument from case studies; and

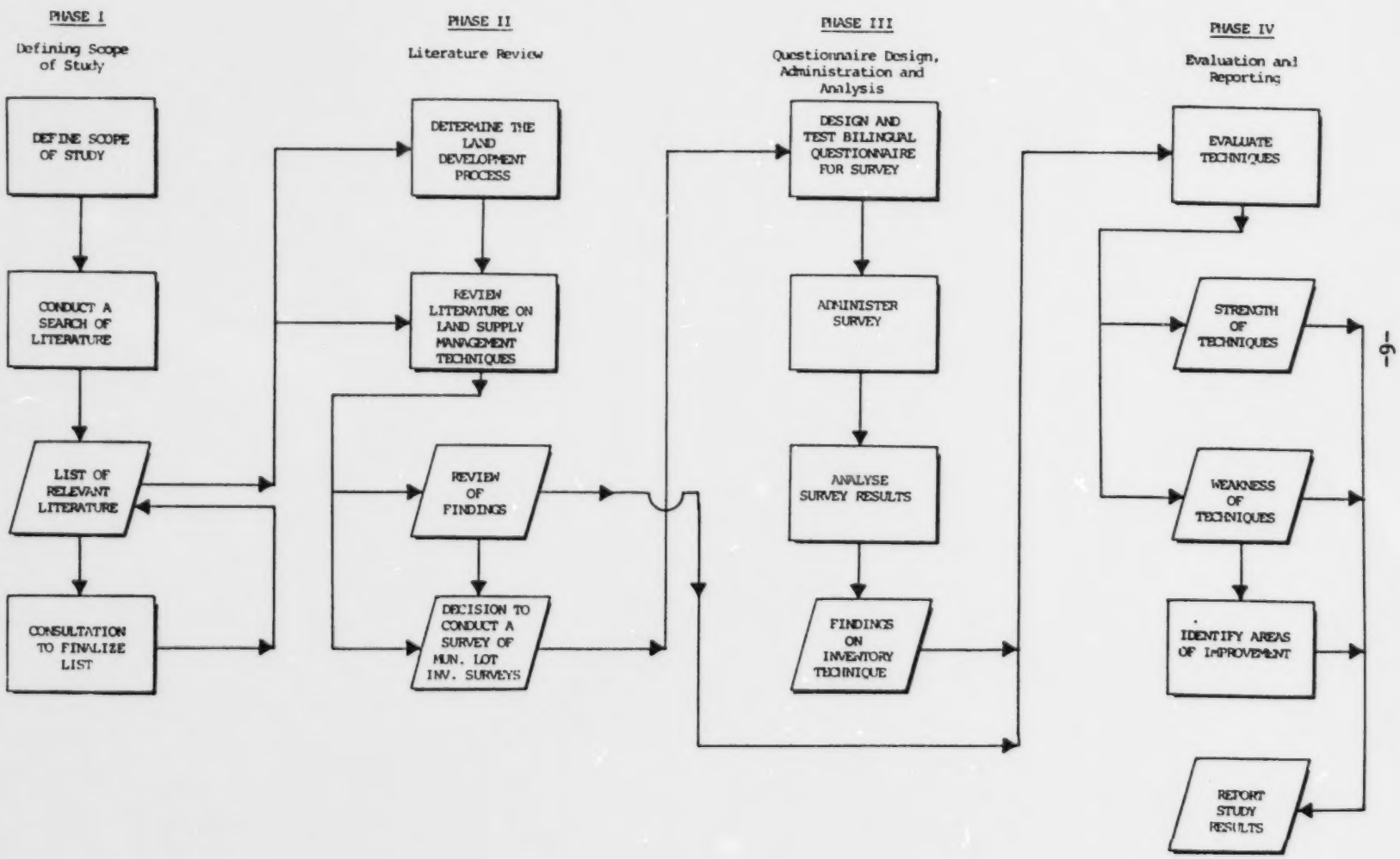
(4) to identify appropriate ways of improving each instrument to meet the development objectives of the community.

2.2 Study Method

Figure 2 presents the study method. The study was conducted in four phases. The scope of the study was defined in Phase I, and was followed by a literature search through the services of various libraries in Ottawa. A list of relevant literature was compiled in consultation with Mr. Peter Spurr of the Research Division, Canada

FIGURE 2

PHASES OF THE LAND SUPPLY MANAGEMENT STUDY



Mortgage and Housing Corporation and Dr. Larry Martin, School of Urban and Regional Planning, University of Waterloo.

In Phase II, a study outline was prepared and the relevant literature reviewed. The review of land supply management instruments revealed that while there was some information available on most techniques, the available literature on the use of lot inventory surveys, as an instrument of land supply management, was particularly inadequate. As it is obviously critical to any deliberate supply management system to have a good monitor and feedback process, it was clear that the study must find more information about the use of lot inventory surveys. It was decided that the study survey urban municipalities to determine the prevalence of land inventory monitoring.

A bilingual questionnaire to survey the monitoring of residential land in municipalities was developed and tested in Phase III. The questionnaire was sent to 104 planning offices in urban municipalities across Canada. The phase concluded with an analysis of the responses to the questionnaire and the preparation of a written report of the survey findings.

In Phase IV, the various land supply management instruments were evaluated on the basis of existing literature as found in Phases II and III. The strengths and weaknesses and areas of improvement of each technique identified are presented in this report. It is intended that the report be circulated to interested practitioners and academic

experts for comment, and that these views will then be consolidated into a final draft. The final publication should represent a thoroughly considered body of research on the state of land supply management in Canada.

3.0 URBAN LAND SUPPLY MANAGEMENT

Before examining land supply management instruments, it is necessary to first define the urban land supply process and the objectives of land supply management. Section 3.1 presents an overview of the supply process and Section 3.2 discusses the functions and objectives of land supply management. Land supply management instruments as applied in each function are presented in Section 3.3.

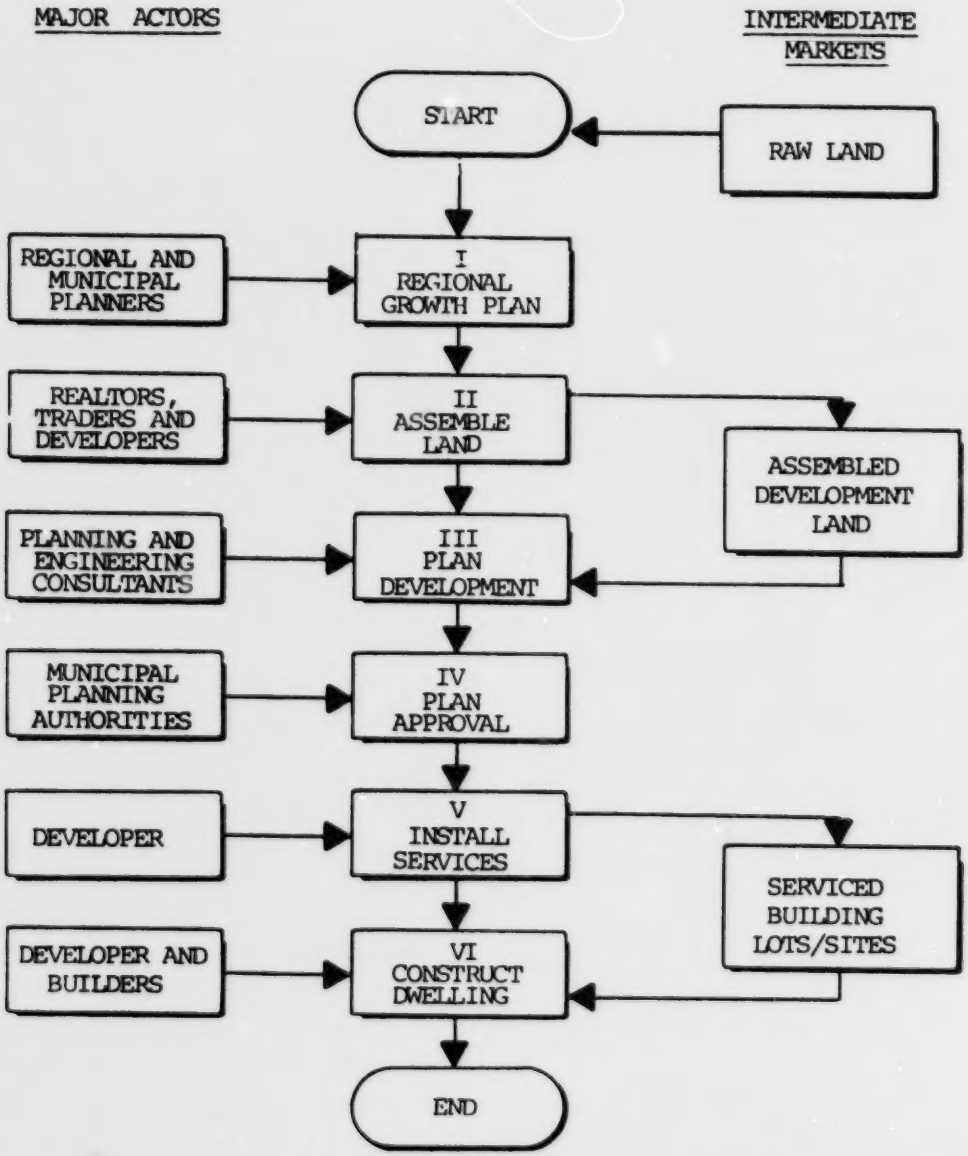
3.1 Urban Land Supply Process

Urban land is supplied through a specialized land planning and development process. The basic steps in the residential land supply process in Canada are presented in Figure 3. It begins with the regional planning process and public intentions to extend infrastructure to certain areas, thereby giving lands in those areas a greater development potential than other raw land. At the second stage, these developable lands are assembled by realtors and developers. The third stage is plan development, in which developers hire planning and engineering consultants to develop a subdivision plan. The plan is approved at the fourth stage and is subsequently registered. In the fifth stage, site services are installed, followed by dwelling construction on the serviced lots in the sixth and last stage.

The land markets in the development process are identified as raw land in potential growth areas, assembled land, planned land and serviced

FIGURE 3

GENERIC STEPS IN THE RESIDENTIAL LAND SUPPLY PROCESS



building lots or sites. The successive developments to the land incrementally add to the raw land price.

As shown, the land supply process involves numerous actors, including both planners and other decision makers in the public sector as well as investors, their agents and support apparatus in the private sector. It is evident that as inputs into the development process, each group of decision makers affects the nature (for example, type of housing, services, lay out of the subdivision), cost, and the rate of development.

Understandably, the interaction of each of the inputs will vary with the housing market factors as well as the land development regulatory process that is in place in the municipality. The specific requirements for plan development, plan registration, installation of services and dwelling construction, which vary according to the municipal development regulations, would have direct implications on the types and size of land inventories that are maintained in the development process. The developer is less likely to hold large inventories of serviced lots if he has to carry the servicing costs. In Ontario, Alberta and British Columbia, for example, the developer is responsible for the cost of installing site services within the subdivision, while in Quebec, a large share of the funds for installing the services are raised by the municipality.

3.2 Land Supply Management - Functions and Objectives

Public management of the supply of urban land involves three or four sequential management functions of planning, regulating and monitoring and, in some cases, supplying. A general approach and inputs and outputs of the system are presented in Figure 4.

3.2.1 Functions of Supply Management

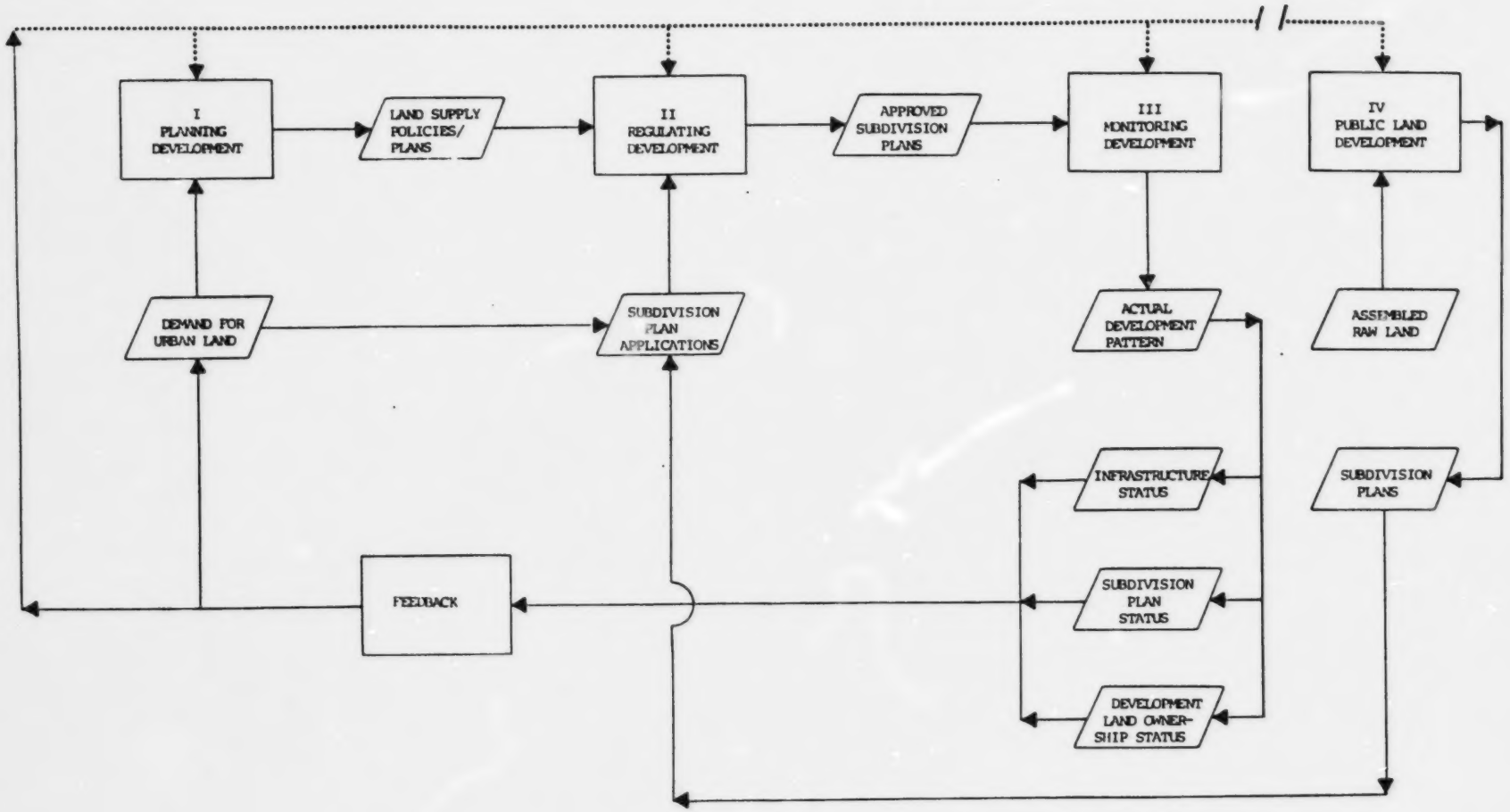
Planning for the conversion of raw land to urban land arises from the demand for urban land. Municipal development planning results in the Official Plan and the determination of policies and plans for urban development (location, type and rate of development). The lands designated for development are phased according to the municipality's land supply policies and plans in staging development.

Development regulation implements the development staging plan in Step II, by approving subdivision plan applications that are consistent with the municipal land development policy and staging plan. Subdivision plans approved by the regulatory process are monitored in Step III for the actual pattern of development.

The monitoring function serves to keep track of the actual pattern of subdivision development by producing reports on the status of infrastructure supply, status of lots in subdivision plans and subdivision developments, and land ownership status. This information is then fed

FIGURE 4

URBAN LAND SUPPLY MANAGEMENT SYSTEM
A GENERAL APPROACH



back to assist decision-making in the development planning and regulating functions.

For municipalities in which there is a public land development program, the management system includes supplying residential development lots to the residential land market. The functions involve assembling raw land, preparing plans of subdivision for sites to be developed and servicing lots before selling them to builders. The subdivision plans of the public land development agency are submitted for subdivision approval and subjected to the same scrutiny as applications from private developers.

3.2.2 Objectives of Supply Management

The goal of land supply management is to produce the kind of urban development that would allow efficient production and provide an attractive living environment at moderate prices. The threefold objectives of managing land supply are to promote efficiency, equity and price stability in the land development process.

3.2.2.1 The Efficiency Objective

Public intervention in the urban land supply process can promote efficiency in production through the well-ordered development of government services and allocation of land uses.

Since the government is responsible for providing services such as sewers, drains and roads in the community by means of community taxes, they need to be able to discourage development that is expensive to service and maintain. By directing development to avoid leapfrogging and phasing development according to a well-ordered infrastructure development plan, the authorities can reduce the cost of public services and achieve a more efficient allocation of public funds.

The planning of land uses is aimed at providing a balanced and orderly arrangement of land uses, whereby economic efficiency is achieved, negative external effects are reduced and public amenities are protected.

3.2.2.2 The Equity Objective

Equity is expressed in terms of equitable availability of development land to promote competition and choice. If the supply of land with approval for subdivision development is owned by a few developers, it is possible for an oligopolistic situation to arise. The developers can get together and agree to limit the production of serviced lots and new housing, to maximize their profits when house prices are on the rise.

Similarly, they can agree to produce the type of housing which would help them to create an image that will ensure them a future market. Under a free market situation, the developers will not provide

moderately-priced high density housing if they see that by concentrating on the production of large high-priced single family housing they will be able to continue to attract buyers who are looking for a low density housing environment.

To promote competition and choice, the management system, which is responsible for supplying development land for the whole community, has to ensure that there is no market concentration and that there is a large number of developers and builders supplying a range of dwelling types in sufficient quantities to meet the requirements of the various income groups in the housing market.

3.2.2.3 The Price Objective

This objective is closely related to the equity objective. The land price objective aims at moderating land prices. The price of a development lot is determined by the level supply, i.e. the quantity in terms of the demand as well as development cost inputs such as planning, lot levies, servicing costs and taxes.

It is argued that a large inventory of serviced lots can help to moderate the increase in lot prices particularly if the supply is not concentrated in the hands of a few developers. The other argument is that if the regulatory process can be streamlined, the carrying cost of a development lot would be reduced and therefore result in lower prices for the consumer. Finally, a moderation of development and dedication

standards of municipalities would help to keep serviced lot prices moderate.

3.2.2.4 Summary

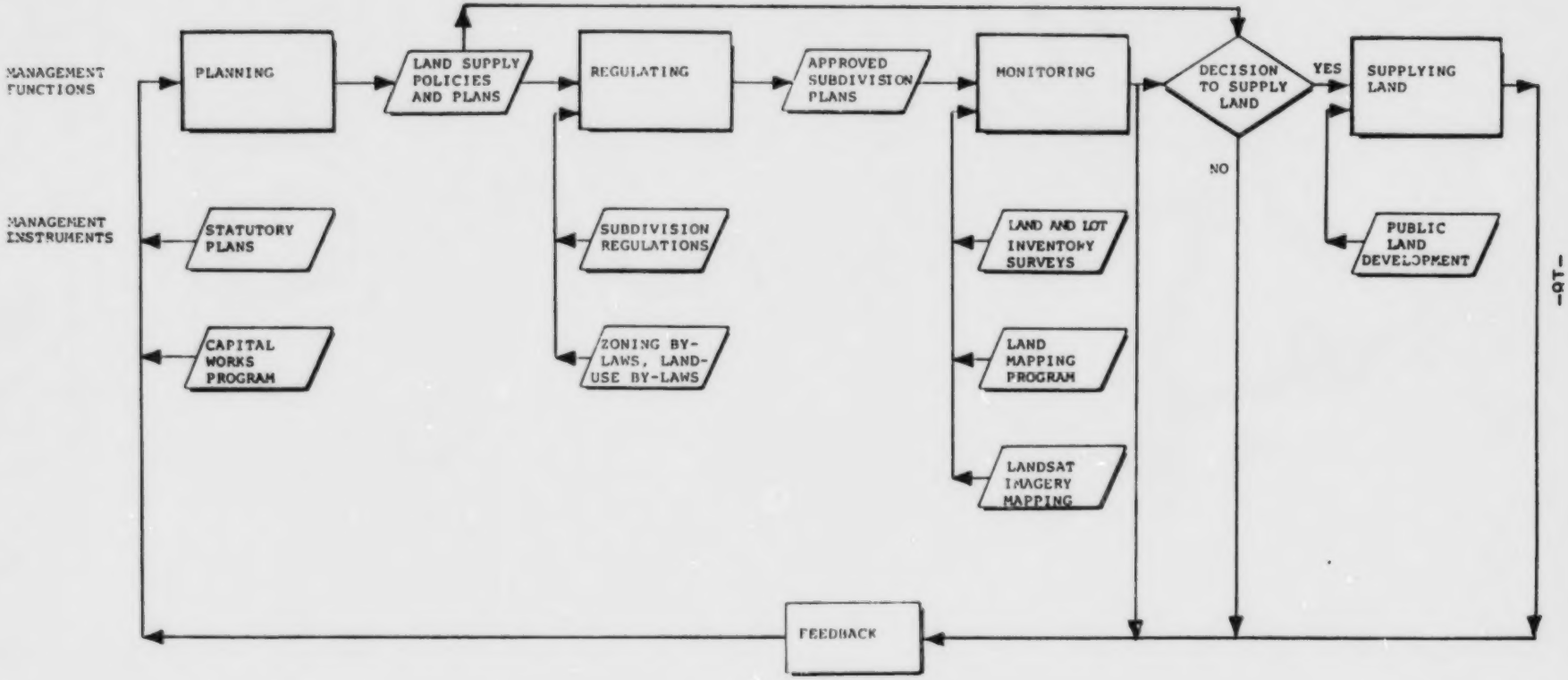
It is apparent that the three objectives are in conflict. This, however, does not mean that they are invalid. Each of the land supply management instruments can be structured to reflect the weighting given to each objective by the municipal authorities and the residents of the community.

3.3 Review of Urban Land Supply Management Instruments

The review of Canadian literature concerning land supply issues revealed the use of eight instruments in land supply management (see the list of readings in Section 8 for the literature examined). They are statutory plans, capital works programs, subdivision regulations, zoning bylaws, land supply monitoring programs (lot inventory surveys and land mapping) and public land development. On examination, it was seen that they could be grouped under three functional headings, planning, regulating and monitoring, as illustrated in Figure 5. The instruments are presented according to their placement by supply management functions. An instrument which is useful but not mandatory to the land supply management system is public land development. With this instrument, the municipality can be directly involved in supplying needed residential land.

FIGURE 5

LAND SUPPLY MANAGEMENT INSTRUMENTS



The following three sections describe and evaluate the land supply management techniques. The objectives, principles and methods of implementation of each technique are defined and significant case studies, where they exist, are discussed in terms of experience and results.

4.0 INSTRUMENTS FOR PLANNING SUPPLY

The planning of land supply involves forecasting the amount of land required by the various land uses (residential, commercial, industrial, recreational etc.) and determining the accompanying infrastructure needs. The instruments by which planning of land supply is accomplished are statutory plans and the capital works program. The instruments are described in Section 4.1 and evaluated in Section 4.2.

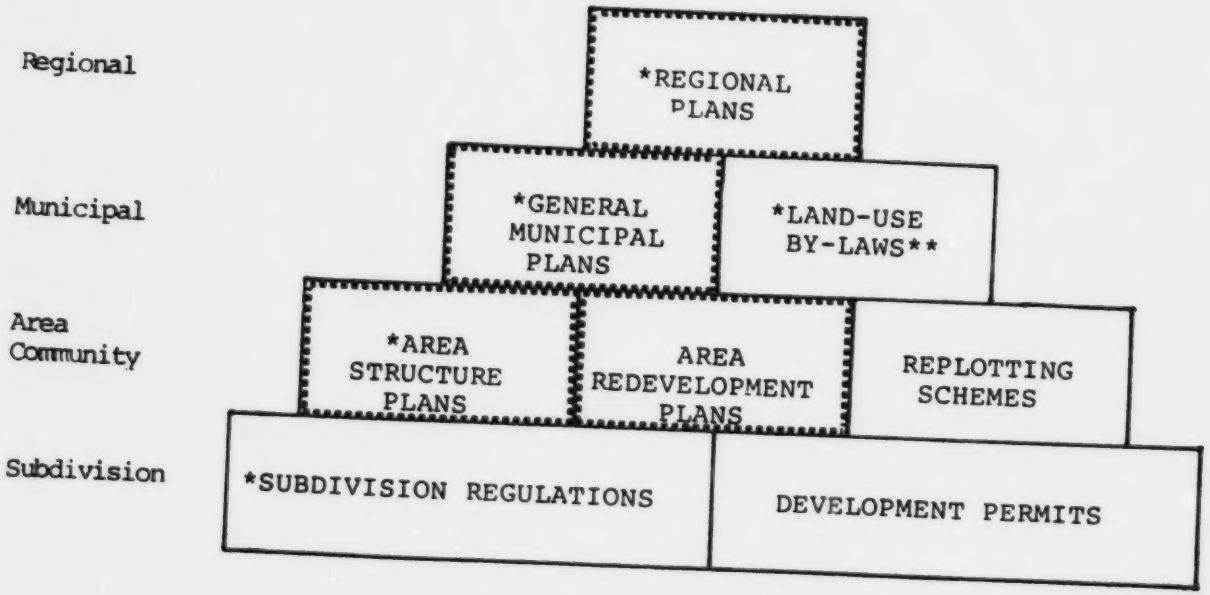
4.1 Description of Instruments

4.1.1 Statutory Plans

The term statutory plan is employed here to generally describe plans used to regulate or promote a particular type of development. The number and level of plans that may exist ranges between 1 to 3. The description of a more elaborate system is appropriate here because the plans would also apply to those in a simpler system. Figure 6 provides an example of the hierarchy of plans and bylaws in place in Alberta to regulate development. For the development of a new subdivision, only five plans would apply. They are regional plans, general municipal plans, land-use bylaws (called zoning bylaws in some provinces), area structure plans and approved subdivision plans.

FIGURE 6

HIERARCHY OF STATUTORY PLANS AND BY-LAWS REGULATING LAND DEVELOPMENT IN ALBERTA



* Regulating Development of New Subdivisions

** Zoning By-laws in other provinces

Statutory Plans

Source: Inter-Agency Planning Branch, Planning Services Division, Alberta Municipal Affairs, Planning in Alberta: A Guide and Directory, November 1980.

Footnote: For a good general overview of the types of statutory plans in place by province as well as their powers, refer to Hamilton, 1982.

The statutory plans for guiding subdivision plan approval are regional plans, municipal plans and area structure plans. This section describes the purpose and nature of the statutory plans. Figure 6 shows the ranking of the plans in terms of importance and comprehensiveness. The plans toward the top contain broad policy statements regulating development and land use over large areas while those toward the bottom cover a smaller area and contain more specific land use policy statements. In general, the plans toward the bottom are required to conform with those higher up in the hierarchy. The diagram is useful in not only demonstrating the hierarchical relationship between plans but also their relationship to the Land-Use By-Laws and Subdivision Regulations.

Table 1 shows the types of statutory plans regulating subdivision development in the provinces as well as their implications with regard to community land use plans and subdivision developments. The nature of the relevant statutory plans of each tier as they occur in Alberta, is discussed below to provide a general idea of the contents and objectives of these plans. [1]

---

1 The definition of equivalent plans in other provinces are contained in the respective Provincial Planning Acts.

TABLE 1

TYPES OF STATUTORY PLANS FOR REGULATING
SUBDIVISION DEVELOPMENT BY PROVINCE

	B.C.	ALTA.	SASK.	MAN.	ONT.	QUE.	N.B.	N.S.	P.E.I.	NFLD.
REGIONAL PLAN	X	X		X	X	X	X	X	X	X
Prevails over Local Plans and Zoning Bylaws					X		X	X	X	
No development shall be carried out that is inconsistant	X			X			X			
May control use and development of land		X								
MUNICIPAL PLAN	X	X	X	X	X	X	X	X	X	X
No inconsistent development allowed	X	X	X	X	X	X	X	X		
Municipal By-laws to conform									X	

Source: Hamilton, 1981.

The regional plan is the plan to which all other plans must conform. It "attempts to provide for the best and most economic use of land on a regional scale", encompassing "several municipalities that are functionally related through topographical, economic, and/or transportation linkages" (Alberta Municipal Affairs, 1980, p. 16). In the regional plan, the region is divided into land use classes according to the objectives of the plan and the land use suitability characteristics of the land.

Some of the land use criteria employed to achieve compatibility and efficiency in land use development were physical environment, natural resources, present land use, projected population, potential land use conflicts, and land demand by the various land uses.

After making these assessments, the regional planners present a number of preliminary options for future growth at public meetings. The views received serve as input to the preparation of a Draft Official Plan. The Draft Official Plan which designates the location and timing of future growth centres in new areas or as extensions of existing areas, becomes the Official Plan when it is adopted.

The municipal plan develops, in greater detail, the broad policies and programs contained in the regional plan for application at the regional level. The plan is largely concerned with "such matters as the

location of different types of land use, the direction of future growth, the design of the transportation network and the level and location of utility servicing" (Alberta Municipal Affairs, 1980, p. 19). The plan is prepared based on a number of background studies on current land uses, population growth projections, transportation needs etc.

The next level plans are the area structure plans, which are prepared for growth areas of the municipality as stated in the Planning Act, 1977:

(2) An area plan shall . . .

"describe, (i) the sequence of development proposed for the area, (ii) the land uses proposed for the area, (iii) the density of population proposed for the area, (iv) the general location of major transportation routes and public utilities" (Province of Alberta, 1977).

Depending on the planning ordinances in place and available planning resources, all three tiers of statutory plans may or may not be found in the municipalities across Canada. Regional plans may be prepared in all the other provinces. Saskatchewan, for example, has no regional planning. The highest level of statutory plans for development planning in Saskatchewan, therefore, is the municipal plan.

As for the municipal plan, it is optional for municipalities in all provinces with the exception of Alberta. In communities where there are limited planning resources and urban growth is not extensive, area plans are usually not found. However, a number of urban municipalities in Ontario, experiencing extensive growth, are preparing community plans which are similar in concept to the area structure plans of Alberta.

The preparation of a municipal plan is not mandatory in any province, except Alberta. This is not to say that municipal plans do not exist. Because it is not mandatory, the common practice among municipalities is to prepare a general planning policy statement which serves as an unofficial guide to future growth and development. Such a policy statement is preferred because of the inconvenience of amending a statutory plan once it is adopted (Hamilton, 1981).

4.1.2 Capital Works Program

The supply of infrastructure for the development of new areas relates to the scale of the project. In all provinces, the provision of trunk services (water and sewage treatment plants, trunk sewers and water pipes, trunk roads) are the responsibility of the public sector. The regional government is responsible for the regional trunk services while municipal trunk services are financed by the municipal government. With the exception of Quebec, all infrastructure to be

installed within a subdivision are financed and constructed by the developer. The municipality takes over the maintenance of the infrastructure on completion of the subdivision.

Infrastructure planning for the municipality, which is based on the policies of Official Plan, uses a three to five year capital budget system to stage development. The plan produced is the capital works program.

This is the planned expenditure on capital projects such as development of water and sewer trunks, storm drainage systems, sewage treatment plants and roads. Where there is a regional level of government, the responsibility for providing trunk services to new subdivisions is under the regional authority, and the municipality is responsible for providing all the local services.

Funding of these services is provided by the municipality (through property taxes), provincial sources and cash imposts in the form of lot levies collected from developers on registration of approved subdivision plans. The extent of the program is dependent on the demand for urban land and the availability of funds.

The capital works program both affects and is affected by the pattern of land development in the municipality. This relationship is exemplified by the processes in Kitchener, Ontario. Kitchener

publishes a three year Staging of Development Report annually. The report presents the expected date of municipal draft approval of subdivision plans on the basis of the timing of supply factors (capital works program, regional priorities and lot levy capability) and demand factors (imminent approval of Community Plans, projected development programs of School Boards and other agencies) (City of Kitchener, 1980).

Since subdivisions are approved only when services can be made available, the capital works program is the most significant factor in the staging of development in Kitchener. However, if feedback on land development indicates that there is a critical need for a certain project of the works program to be accelerated to meet housing needs, and if the need can be accommodated, the necessary changes to the program would be made.

The capital works program directly affects the land supply and staging of development of the municipality because it establishes the location, quantity and density of residential development that can be approved by the subdivision process over a particular time period.

4.2 Evaluation of the Instruments

As land supply planning instruments, statutory plans and the capital works program provide the municipality with a framework for designating and timing the areas of new development.

Overall, the use of statutory plans to plan for future growth and development has served the objective of designating the location and type of future land uses in municipalities throughout the provinces. Where the process of plan preparation takes into account the interests of all affected parties (the municipality, the residents, land owners and industry) for the common good, they would define as efficient and as equitable a land development pattern as possible.

However, because the decisions are political decisions, the Official Plan may appear to favour the group of land owners who would benefit from having their land designated for future residential development. On the other hand, for those who own land designated to remain in a less developed stage, it would seem that planning has removed some of their development potential. For equity, it is essential that these general land use allocations be made long before the actual time when urban development may occur, when there is a large stock of land involved, so that the impact of the planning decision is diluted over a broad market and the impact on any individual parcel of land is minimal.

The capital works program can serve to reduce or promote market power by the staging of its infrastructure plan. To reduce market power, the program would have to be designed to allocate trunk services in such a way that there would be adequate services to ensure that land supply is not restricted to a few owners.

The areas for which trunk services are available and therefore subdivision plans can be approved should not be limited to a particular subregion of the municipality and increase market power for few developers. To moderate increases in house prices, it may be necessary for the works program to be designed less efficiently to enable serviced lands in more subregions to be brought on-stream to promote competition and choice in the housing market. It would be desirable to study these matters quantitatively and to have numerical guidelines concerning appropriate oversupply levels.

Thus, even though the cost and efficiency are important considerations for planners and politicians in infrastructure planning, the decision makers would have to ensure not only an adequate supply of development land but also adequate competition and choice, to meet the equity and price objectives.

5.0 INSTRUMENTS FOR REGULATING SUPPLY

Two instruments found widely used for regulating the supply of urban land and implementing the land supply policies were subdivision regulations and land-use/zoning by-laws. Section 5.1 describes the techniques and Section 5.2 evaluates them.

5.1 Description of Instruments

5.1.1 Subdivision Regulations

The subdivision regulations enable the municipality to regulate the location, type, amount and timing of the supply of urban residential lots. As shown in Figure 3, it is the input of subdivision approval into the residential land development process that paves the way for the conversion of assembled raw land into serviced lots for housing construction.

As indicated in Figure 5, the subdivision approval decision is made on the basis of the land supply policies and plans as determined by statutory plans and the municipal capital works program. The decision takes into consideration the availability of trunk servicing, consistency with planning policy statements or plans and the supply of approved lots by submarkets (type of residential lots, location and developer) where possible. These considerations will ensure that there would be adequate infrastructures for the new subdivision, that the land use patterns would be compatible with the existing uses and overall growth strategies, and that competition and choice are promoted in the housing market.

The subdivision process involves the dividing of a legal parcel of land into one or more separate legal parcels of land as well as the commitment of some investment of capital by the owner, in the return for permission to subdivide. Subdivision approval is granted on the basis of a development agreement under which the approving officer imposes obligations on the developer in all provinces with the exception of Quebec. The capital investment the owner/developer has to make is in the form of hard and soft costs. Table 2 presents the cost components of a single family lot. Hard costs applies to the on-site costs of water and sanitary services, streets and utilities, and the dedication of land. The soft cost refers to the lot levies to be paid to the municipality. These levies are used in some cases to maintain the quality of services in the vicinity of the subdivision, e.g. to extend trunk sewers. In other cases, the levies become part of the general revenue of the municipality (Hamilton, 1981, pp. 52-58).

Table 3 summarizes the impact of the implementation of subdivision regulation and zoning by-law on the cost of subdivision development in Kitchener. The stages of the process at which each cost is incurred by the municipality and the developer respectively are also shown. It can be assumed that these costs are generally applicable to all municipalities with the exception of most municipalities in Quebec, where the servicing costs are amortized by local improvement taxes. In the last two years a number of Quebec municipalities have started to require developers to pay for the servicing costs for sewer, water, storm sewer and road foundation. The municipality still finances the

TABLE 2

COSTS COMPONENTS OF A SINGLE FAMILY LOT (1974), MUNICIPALITY OF MISSISSAUGA

Components	Dollars		Percent	
Land Costs		6,590		28.7
Carrying Charges (including taxes)		1,697		7.4
Servicing Costs		7,750		33.7
Rough Grading	550		2.1	
Sanitary Sewers	800		3.5	
Storm Sewers	1,500		6.5	
Watermains	800		3.5	
Roads and Lanes	1,800		7.8	
Sidewalks	550		2.3	
Electrical	1,000		4.4	
Off-site	100		0.4	
Landscaping	400		1.7	
Miscellaneous	300		1.3	
Municipal Levies		1,935		8.4
Municipal	1,025			
Regional	615			
Engineering	271			
Planning Process	24			
Consultants		1,170		5.0
Planners	100			
Engineers	300			
Surveyors	620			
Others	150			
Overhead		800		3.5
Profit		3,058		13.3
Total		23,000		

Source: Derkowski, 1975, p. 110.

TABLE 3

COSTS IN SUBDIVISION DEVELOPMENT

CITY OF KITCHENER

Costs to the Municipality	Subdivision Development Steps	Costs to the Development Firm
	Purchase Land	— Raw Land and Commission Costs
Administrative Costs (municipal)	Plan Preparation	— Consultant Fees
Administrative Costs (municipal)	Preliminary Plan Submission	— Zoning By-Law Application Fee
	Plan Review by Municipal Process	
Administrative Costs (regional)	Plan Submission to Regional Authority	— Consultant Fees
	Plan Review and Circulation	
- costs of trunk servicing	Plan Draft Approval	— Consultant Fees; Regional Levy
	Prepare Zoning By-Law and Subdivision Agreement	
Administrative Costs (municipal)	Plan Formal Approval	
	Plan Registered	— Municipal Lot Levy; Increased Property Taxes
	Site Services Installed	— Servicing Costs, Consultant Fees
	Building Permit Application	— Building Permit Fee
	Construction of Dwelling	— Construction Materials and Services

Source: Unsoy, 1982

cost of paving, lighting and road finishes through local improvement taxes, for example in the City of Gatineau. Figure 7 provides an idea of the proportion of the total lot cost comprised by servicing costs and municipal levies in a number of cities across Canada.

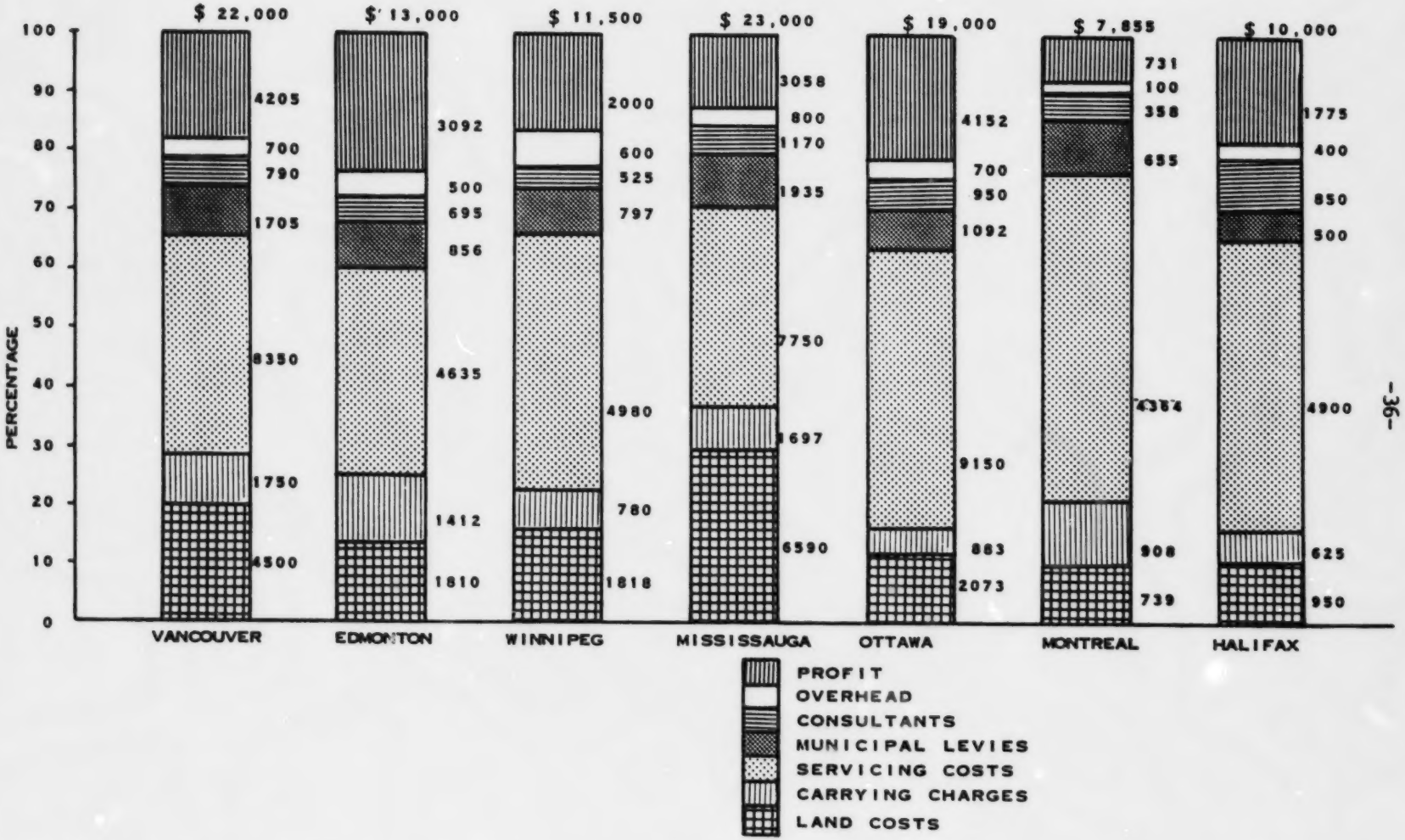
Financial costs to the municipal and regional development agencies consist mainly of administrative and servicing costs. Administrative costs are incurred in administering planning control procedures. The cost of trunk servicing is shared between the municipal and regional governments. The local municipality is responsible for the provision of social services such as schools, parks, police and fire services. Because municipal revenues are derived from property taxes, the municipality is careful not to approve subdivision development that will be a tax burden to the existing inhabitants. In addition, the site servicing standards set are also such that future maintenance costs would not be onerous on the rest of the community.

The costs of subdivision development to the development firm consists of land costs, municipal levies, consultants' fees and overhead. At the plan preparation stage, costs incurred include cost of the land and the fee paid to consultants to draw up the subdivision plan.

On obtaining draft approval, regional lot levies are payable and on final approval all other conditions have to be fulfilled. On plan registration, the municipal lot levies are payable to the local municipality and property taxes are also increased.

FIGURE 7

LOT PRICE COMPONENTS IN SELECTED CITIES



Source: Derkowski, 1975, Costs in the Land Development Process.

The other costs such as site servicing cost, building permits and construction costs are incurred with house construction. Throughout the development period, if the developer has borrowed money for the development, the carrying charges would also include interest payments.

Apart from these capital investments under the subdivision agreement, the developer often expends considerable time and expense to obtain a subdivision approval.[2] A brief overview of the approval procedures and the length of the process in time will provide an idea of the stages the developer and municipalities must complete in order to satisfy the demands of the municipal subdivision regulations.

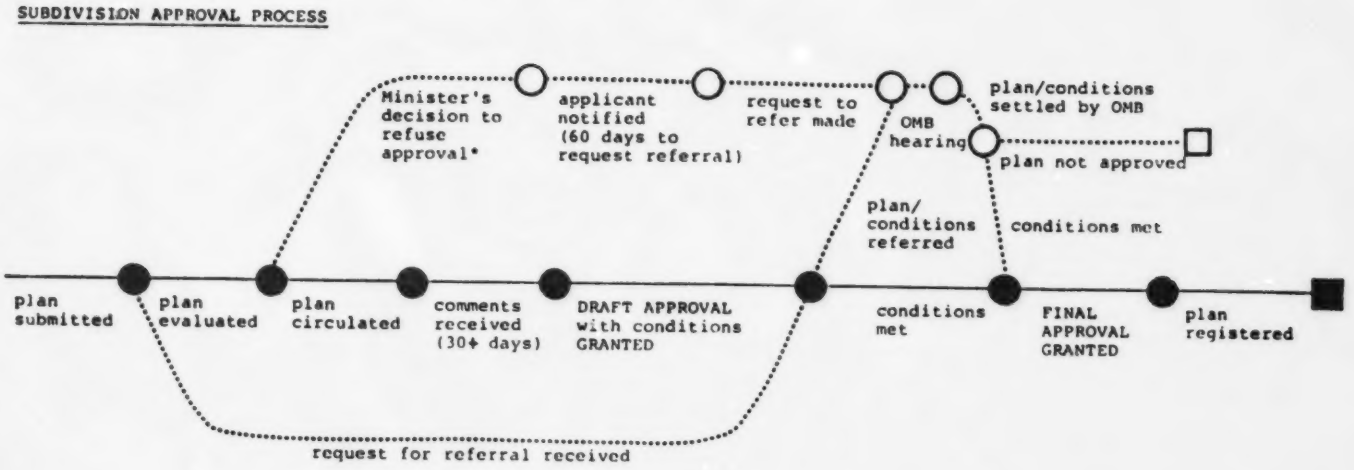
The schematic of the subdivision approval process in Ontario shown in Figure 8 represents the seven basic steps in the approval process that are common to all provinces. The agencies to which the plan is circulated and the number of authorities involved in evaluating the

---

2 For an overview of the subdivision approval, and development process across Canada, refer to Derkowski's comparative study of urban land development in eleven cities. For more recent detailed descriptions and evaluations of the subdivision approval process in selected cities, see Eger (1980) for Montreal, Dale-Johnson (1979) for Coquitlam, Surrey and Vancouver, Proudfoot (1980) for the Metropolitan Toronto area, and McFadyen and Johnson (1981) for Edmonton.

FIGURE 8

SCHEMATIC OF SUBDIVISION APPROVAL PROCESS, ONTARIO



* Minister's decision to refuse approvalcan be anytime prior to draft approval.

Where the subdivision approval authority has been delegated, the Minister may call-in a subdivision plan anytime between submission and final approval.

Source: Government of Ontario, 1979. The Planning Act: A Draft for Public Comment.

plan will vary depending on the municipality and the province in which it is located. As inputs to the subdivision approval decision, the comments provide information on the impact of the proposed subdivision plan on the strategic plans and resources of the respective agencies. Table 4 provides an example of the agencies to which the subdivision plan is circulated. They include Municipal Agencies, Regional Agencies, Utilities and Provincial/Federal Agencies. The name given for the agreement also varies. In Ontario, it is called the subdivision agreement while it is called a land-use contract in British Columbia.

Figure 9 shows the process for subdivision approval in place in the City of Gatineau, Quebec with the adoption of the 1982 Planning Act. The process has been noted to work faster than many of the other provinces' because fewer agencies are involved and more authority is given to the planning department. The preliminary plan is evaluated only by the city for approval. Only when the preliminary plan is approved is it circulated to the utility companies and the city departments (engineering, building permit etc.) for their information. The processing of the subdivision plan is further speeded up with only the approval of the planning department required for the final plan.

Table 5 summarizes the findings of the survey by Derkowski on the complexity of the subdivision approval process across Canada (Derkowski, 1975). Municipalities in the Province of Quebec and Saskatchewan rank highest in terms of minimum processing time. This is

TABLE 4

AGENCIES CIRCULATED FOR COMMENTS BY CITY OF KITCHENER

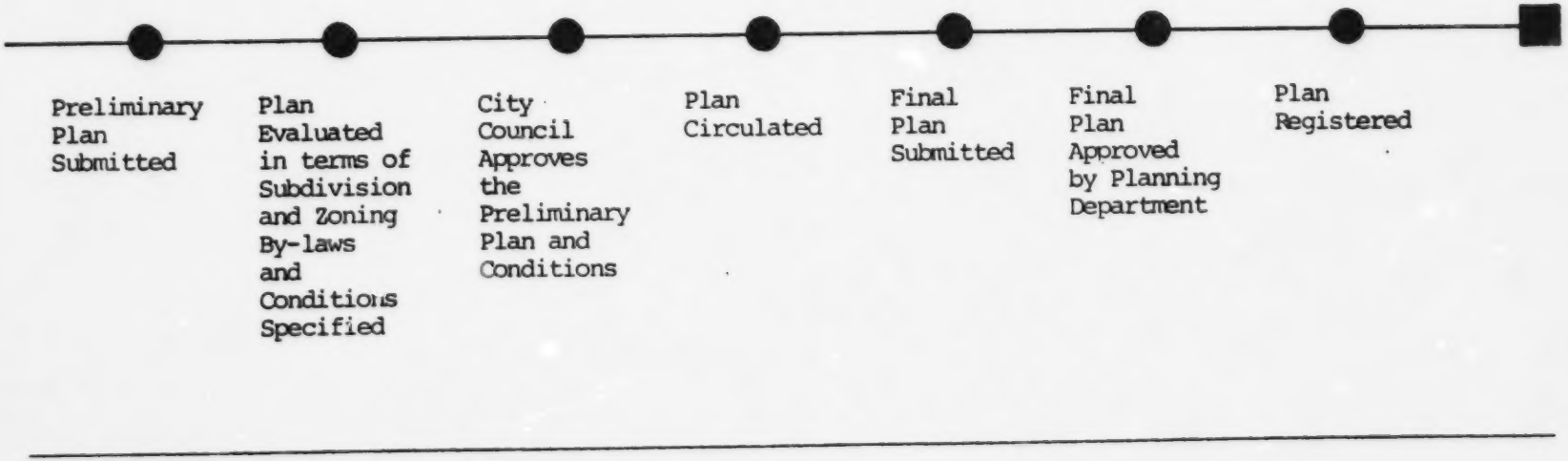
Municipal Agencies	Subdivision Approval	Zone Change
Chief Building Inspector	x	x
Commissioner, Planning and Development	x	x
Director of Development		x
Director of Traffic Services	x	x
Director of Utilities	x	x
Commissioner of Parks and Recreation		x
Director of Engineering	x	x
Fire Chief	x	x
Regional Agencies		
Health Unit	x	x
Planning and Development Department	x	x
Engineering Department	x	x
Police Chief	x	
Public School Board	x	x
Separate School Board	x	x
Grand River Conservation Authority	x	x
Utilities		
Hydro Commission		x
Bell Canada	x	x
Provincial and Federal Agencies		
Canada Mortgage and Housing Corporation	x	x
Others		
Adjacent Municipalities		x

Source: Palmer, W.M. (1978), Planning Administration and Development Control in the Region of Waterloo, Waterloo Region Review Commission.

FIGURE 9

SCEMATIC OF SUBDIVISION APPROVAL PROCESS,
CITY OF GATINEAU, QUEBEC

SUBDIVISION APPROVAL PROCESS


Preliminary Plan Submitted
Plan Evaluated in terms of Subdivision and Zoning By-laws and Conditions Specified
City Council Approves the Preliminary Plan and Conditions
Plan Circulated
Final Plan Submitted
Final Plan Approved by Planning Department
Plan Registered

Source: Planning Department, City of Gatineau, Québec

TABLE 5

SURVEY TO DETERMINE THE COMPLEXITY OF THE SUBDIVISION APPROVAL PROCESS IN MUNICIPALITIES

Municipality	Minimum Time for Approval (Months)	Rank (High to Low)	Number of Levels of Government	Estimated No. of Depts. or Agencies Involved
Calgary	3	7	1	20
Edmonton	6	4	1	20
Halifax	6	6	1	8
Montreal	2	11	2*	5 - 8
Gloucester (Ottawa)	18	2	4	40 - 50
Hull	2	9	3*	5
Regina	3	8	1	10
Saskatoon	2	10	1	8
Toronto	18	1	3	40 - 90
Vancouver	9	3	3	25
Winnipeg	6	5	1	15

* In theory, in practice only municipal government directly involved.

Source: Derkowski, 1975.

probably attributed to the low number of levels of government involved in the processing as well as the comparatively few government departments and agencies to which the plans are circulated.

All the other provinces with the exception of Ontario are shown to record an average processing time of between three to six months. The process appears to be most cumbersome in Ontario, where more than 40 agencies are consulted and as many as four levels of government are involved for municipalities in the Ottawa-Carleton region.

5.1.2 Zoning By-Laws

Zoning and land-use by-laws are instruments by which the municipality ensures that the type of development is consistent with the statutory plans and are compatible with the uses surrounding the new subdivision. Zoning is the process by which municipal plans are made operational. It is the process by which the municipality divides the land area into zones whereby each zone is specified for certain uses at the exclusion of others.

Although the zoning by-laws adopted can be very complex, they basically prescribe standards for lot size, side yards, height, bulk, site coverage, density and use. The residential lots in the subdivision plan would be designated by the respective zoning categories (such as R1, R2, R3).

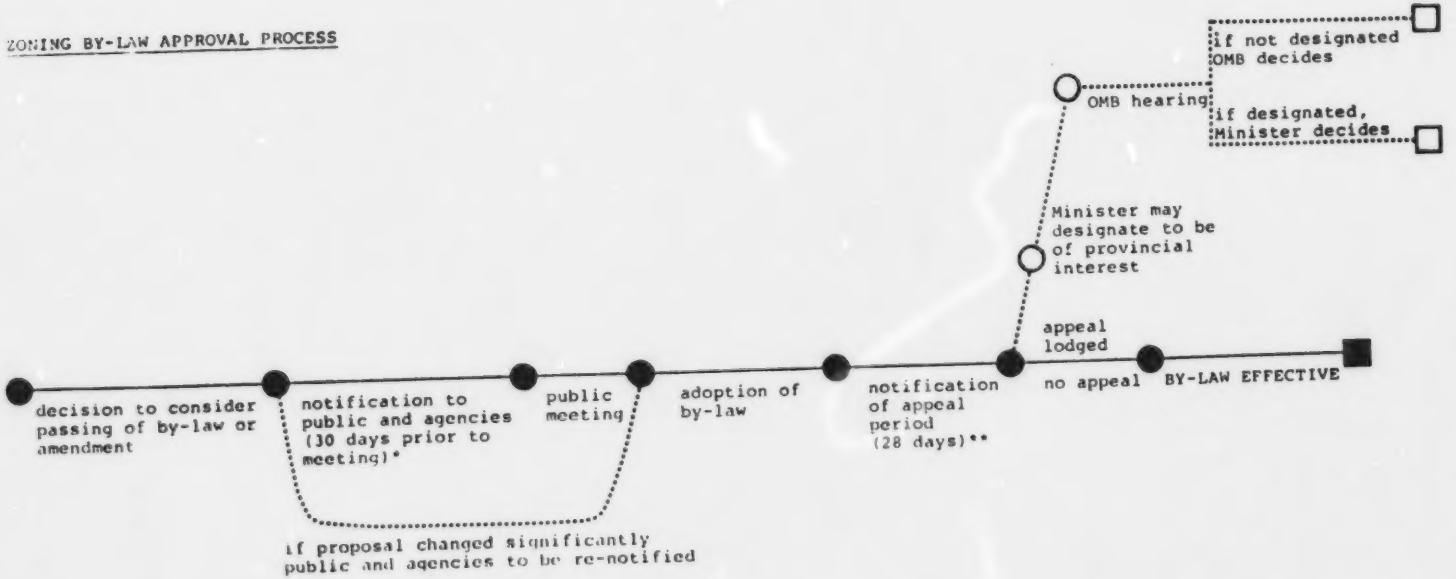
In most cases, where a plan of subdivision is developed from raw land, a rezoning of use of the site is also required. A schematic of the Zoning By-Law Approval Process in Ontario is presented in Figure 10. Applications for rezoning are reviewed in the context of the municipal plan. The application for zone change is usually made at the same time as the subdivision application in order to save processing time, since many of the government departments and agencies consulted are common to both processes, as in the case of Kitchener, Ontario, shown in Table 4. With the exception of Alberta, Saskatchewan and Newfoundland, which employ the development control system similar to the United Kingdom, all the other provinces use zoning as a land-use regulatory tool.

Figure 11 shows that the approval process for the passing of a zoning by-law or an amendment to the by-law is very similar to that in Ontario. While Ontario municipalities circulate the by-law notice to all residents within a radius of 110 m., in Quebec the notice is circulated to all property owners in the adjacent zones. At the same time the municipality in Quebec has to specify the minimum number of objections to the by-law that could prevent its passing. If the minimum number is not reached, the by-law is passed/amended.

The land-use by-law under the development control system has more flexibility than zoning by-laws. The type of standards are similar to that of zoning by-laws with the exception that there is provision for innovative design projects. The time taken to approve a rezoning

FIGURE 10

SCHEMATIC OF ZONING BY-LAW APPROVAL PROCESS, ONTARIO


ZONING BY-LAW APPROVAL PROCESS
if not designated OMB decides
OMB hearing
if designated, Minister decides
Minister may designate to be of provincial interest
appeal lodged
decision to consider passing of by-law or amendment
notification to public and agencies (30 days prior to meeting)*
public meeting
adoption of by-law
notification of appeal period (28 days)**
no appeal
BY-LAW EFFECTIVE
if proposal changed significantly public and agencies to be re-notified

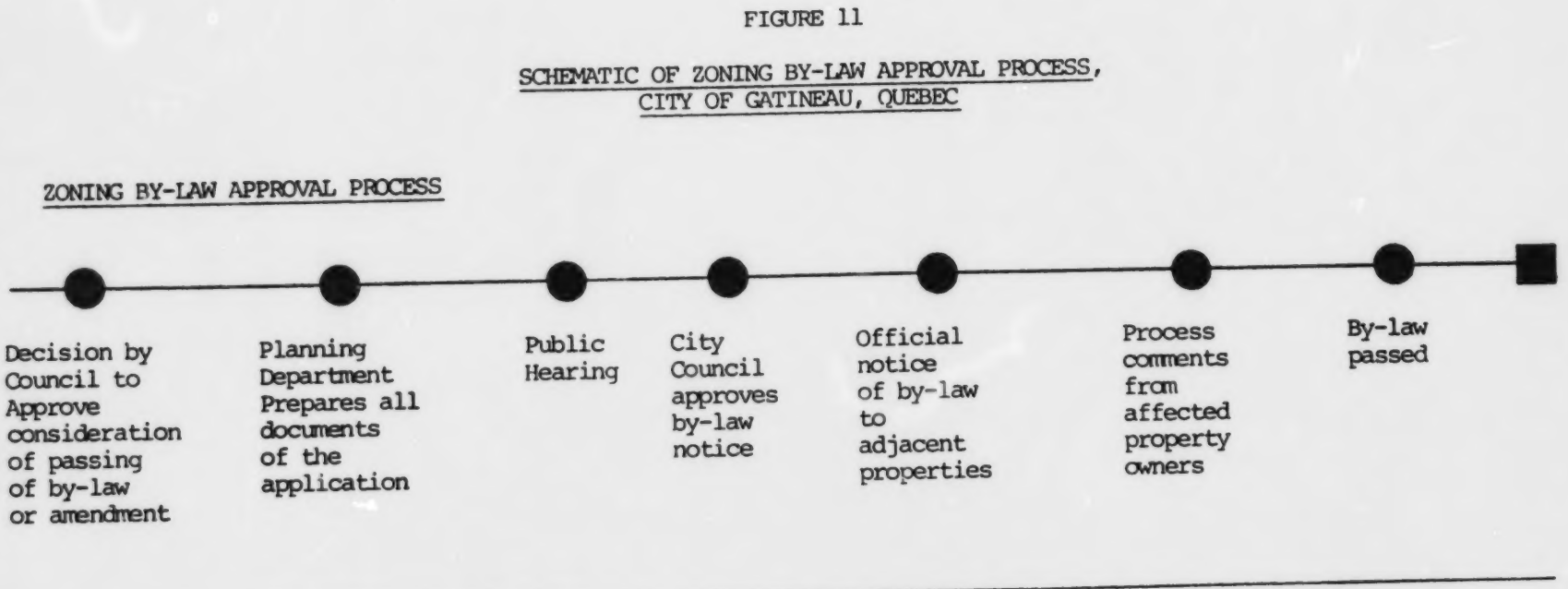
* Notice to be in accordance with regulations

** Notification of adoption must occur within first seven days of the 28 day appeal period.

Source: Government of Ontario, 1979. The Planning Act: A Draft for Public Comment.

FIGURE 11

SCHEMATIC OF ZONING BY-LAW APPROVAL PROCESS,
CITY OF GATINEAU, QUEBEC


ZONING BY-LAW APPROVAL PROCESS
Decision by Council to Approve consideration of passing of by-law or amendment
Planning Department Prepares all documents of the application
Public Hearing
City Council approves by-law notice
Official notice of by-law to adjacent properties
Process comments from affected property owners
By-law passed

Source: Planning Department, City of Gatineau, Québec.

application would not be longer than subdivision application because the subdivision application can only be approved when rezoning has been permitted.

5.2 Evaluation of the Instruments

The policies in the implementation of the instruments can have direct implications on the effectiveness of the instruments in terms of the land supply management objectives.

Firstly, the imposition of unnecessary requirements and procedures for subdivision plan approval, such as excessive standards, unwarranted municipal levies and an extended approval procedure all add to development and carrying costs, and ultimately higher lot prices. The numerous studies over the last two decades on the impact of the administration of the two regulatory instruments on development costs are proof of the significance of the policies and practices that they contain for the housing industry.

Servicing costs have been an issue of controversy and have been analysed in a number of studies. It has been observed that local governments have required more services to be installed by developers and also increased quality of services. Proudfoot (1980) has shown that planning/administrative fees for subdivision plan submission in Mississauga have increased by 800 percent, from $70.00 to $688.97 between 1969 and 1979. The overall direct costs incurred by the

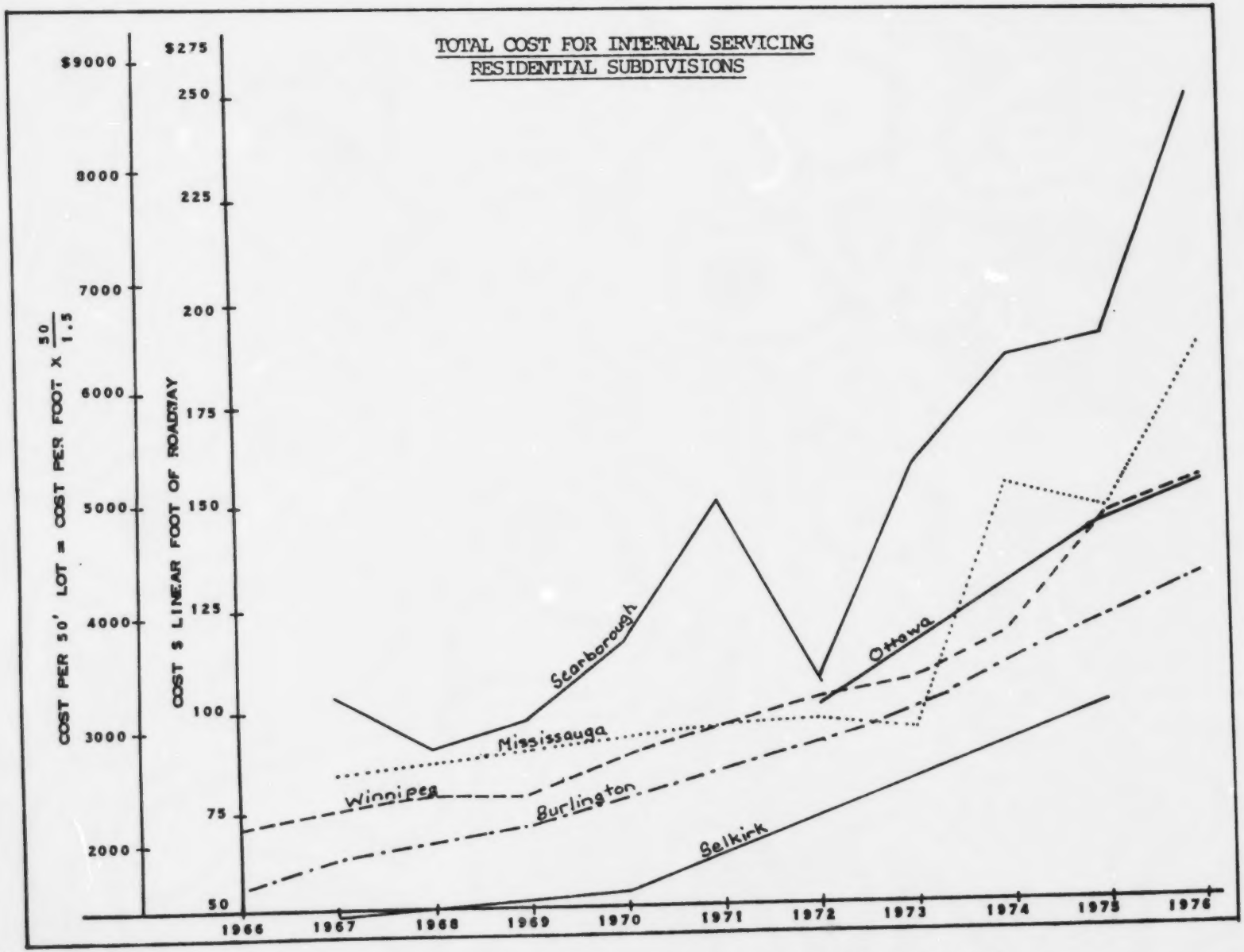
developer in producing residential lots from raw land for hard service costs, fees, lot levies and various cash contributions are reported to have risen by 244.8 percent over the past decade, with the result that the current cash impost costs for a single detached dwelling in the municipality amount to $17,000.

The analysis of the trends in servicing costs and standards by the Federal/Provincial Task Force on the Supply and Price of Serviced Land (1978) found that there was a fair amount of variation in servicing costs among areas despite the general rising trend as shown in Figure 12. It was concluded that the difference in costs could not be accounted for by differences in the physical conditions of the site or the cost of labour and could only be explained by differences in servicing standards.

Among some of the reasons identified by the Task Force for cost differences were unjustified and obsolete servicing standards and municipalities asking for oversized services to accommodate future needs. There is therefore some element of truth in developers' complaints that the servicing standards are amounting to gold plating of services and contributing to higher housing prices.

In addition, it has been noted that the lot levies collected were often not applied strictly to that particular subdivision but rather added to the city's general fund (Unsoy, 1982). Under these circumstances, it is difficult to determine whether the lot levies charged were equitable.

FIGURE 12



Source: Federal/Provincial Task Force on the Supply and Price of Serviced Land (1979).

The lengthy approvals process is no longer considered a significant supply restriction, because once the development industry realizes the time taken to obtain an approval, they simply incorporate the required time into the subdivision planning process. A lengthy approval period, however, has implications for overall costs in subdivision development. The longer lead time means longer carrying costs for the developer. The issue of the long subdivision approval process has been noted by most municipalities and at present, attempts are being made to set time limits on each phase of the approvals process, in particular, the time for various agencies to respond to a plan of subdivision application. Figure 8 shows that a time limit of 30 days has been set for responses to the subdivision application in Ontario.

Besides being lengthy, the approvals process can also be restrictive as noted by the Federal/Provincial Task Force on the Supply and Price of Serviced Residential Land. Restrictiveness in the substance of the regulation tends to result in higher prices over time and they say that there is little the developers can do about these regulations. Proudfoot contends that the basic issue is judgements as to what types of restrictions are justifiable in terms of public interest and what are not. It is difficult to evaluate whether the "planning" related judgements such as standards for flood vulnerability of a site are excessive. Also he points out that politically based judgements such as the resolution by the Council of Mississauga that new developments maintain the high lot frontage levels (a device by which the city can ensure that the new residents will have the same socio-economic

character as the existing population) are more difficult to deal with. He concludes that the present system of land development regulation "represents a compromise among various contending forces . . . with the support of the body politic" (Proudfoot, 1980).

In summary, as instruments for managing land supply, subdivision regulations and zoning by-laws are pivotal to the implementation of the municipal land use policies and plan. However, the success of the instruments in meeting the land supply management objectives are contingent on the nature of the requirements they impose on a development plan and the approvals policies, and the information base on which the approval decisions are made. The foregoing have suggested that excessive standards be reduced and that there be more equity in lot levy charges.

In terms of an information base for decision making, if the planners and decision makers are informed about the lot supply and take-up rates by developer, geographic area and lot type, they can approve subdivision plans that will maintain a broad choice for consumers and encourage competition among developers. Approvals can be consciously granted to ensure that a few developers are not favoured over the rest, but that everyone has a fair chance.

Also if the municipal planners and decision makers are aware of the composition of the undeveloped lots in inventory, they can use the instruments to ensure that the desired mix of housing types within a

subdivision or region is achieved, by advising the developer on the type and design of lots that could be approved for development. This assumes that the municipal decision makers are aware of the composition of the undeveloped lots in inventory.

6.0 INSTRUMENTS FOR MONITORING SUPPLY

Basically all monitoring instruments involve conducting periodic surveys of the inventory. The monitoring of land development provides information on the actual pattern of subdivision development in terms of location, type and rate of development, which can be analysed for supply adequacy. The land supply monitoring instruments selected for review are lot inventory surveys, land and infrastructure mapping and landsat imagery mapping.

Section 6.1 describes the technique, prevalence and the uses made of each technique and Section 6.2 evaluates the usefulness of the techniques.

6.1 Description of Instruments

6.1.1 Lot Inventory Surveys

A survey was conducted among urban municipalities as part of this study on the use of lot inventory surveys as a land supply monitoring technique for the following reasons. From several existing publications it was surmised that the technique was being used by a number of municipalities. However, the extent of its use was unknown and the process and nature of its use across Canada had not been previously documented.

The objectives of the survey were:

(1) to determine the extent and nature of lot inventory surveys in urban municipalities across Canada, and the uses made of the surveys;

(2) to determine the current land supply analysis procedures applied in municipalities using lot inventory surveys; and

(3) to determine the level of interest among municipalities for the introduction of urban land supply monitoring as a land supply management tool and its perceived usefulness.

The survey included all urban municipalities with a minimum population size of 50,000, which account for the home locales of 61 percent of Canada's urban population. The bilingual questionnaire was mailed to 104 municipal and regional planning offices.

The following summarizes the content and the results of the survey. A detailed description of the survey, copies of the bilingual questionnaire and the list of respondents are contained in Appendix A.

6.1.1.1 Survey Questionnaire

The survey questionnaire was divided into three parts. In the introductory section, municipalities were asked to indicate whether raw land and residential lot inventories were conducted, as well as the year in

which each of these surveys was started. If they conducted inventories of residential lots, Part I of the questionnaire would apply, if not, then they would answer Part II of the questionnaire which concerned their plans for future lot inventory surveys. Part III was the conclusion section in which they could comment on the survey itself or on land supply management, in general.

6.1.1.2 Survey Results

Table 6 shows the distribution of the 87 of the 99 responses that were used for analysis. They represent a range of the larger size cities, and every province except Prince Edward Island and the two northern territories. The findings of the survey are discussed under distribution and age of surveys, frequency of update and publication, format of surveys and uses of the results of the surveys.

Distribution of Inventory Surveys

The distribution of inventories of raw land and residential lots conducted by municipalities are summarized in Table 7. Sixty-six percent of the municipalities conduct inventories of raw land, while 65 percent conduct inventories of residential lots. Of those municipalities which do not conduct inventories of residential lots, 53 percent indicated that they were planning to do so, while only 37 percent of municipalities who do not conduct raw land inventories were planning to do so.

Table 6

DISTRIBUTION OF QUESTIONNAIRE TO SURVEY
LOT INVENTORY MONITORING BY MUNICIPALITIES

PROVINCE	Total Sent	Total Used	Not Used	Total Rec'd	Not Rec'd
British Columbia	19	13	6	19	--
Alberta	6	5	1	6	--
Saskatchewan	2	2	--	2	--
Manitoba	3	1	1	2	1
Ontario	44	41*	3	44	--
Quebec	21	18	--	18	3
New Brunswick	2	1	--	1	1
Nova Scotia	5	4	1	5	--
Newfoundland	2	2	--	2	--
TOTAL	104	87	12**	99	5

* One municipality has a population of 40,000.

** These municipalities were not used either because they were rural planning commissions, their total population was too small, or their jurisdictional responsibilities did not include land development monitoring.

Table 7

INVENTORIES CONDUCTED OF RAW LAND
AND RESIDENTIAL DEVELOPMENT LOTS BY MUNICIPALITIES

PROVINCE	RAW LAND INVENTORIED					RESIDENTIAL DEVELOPMENT LOTS INVENTORIED				
	YES	NO Plans to Inventory in Future			Total Respondents	YES	NO Plans to Inventory in Future			Total Respondents
		Yes	No	Total			Yes	No	Total	
Newfoundland	-	1	1	2	2	-	1	1	2	2
New Brunswick	1	-	-	-	1	1	-	-	-	1
Nova Scotia	1	1	2	3	4	-	2	2	4	4
Quebec	12	3	3	6	18	8	5	5	10	18
Ontario	28	3	10	13	41	33	4	4	8	41
Manitoba	-	-	1	1	1	1	-	-	-	1
Saskatchewan	1	1	-	1	2	1	1	-	1	2
Alberta	5	-	-	-	5	4	1	-	1	5
British Columbia	10	2	1	3	13	9	2	2	4	13
TOTAL	58	11	18	29	87	57	16	14	30	87

At the regional level, a greater percentage of the municipalities in the western provinces (Alberta and British Columbia) were conducting inventories of raw land and residential lots than in the other regions.

Age of Inventory Surveys

Table 8 summarizes the ages of the inventory surveys in the various provinces. The majority of the surveys were started in the last ten years. On the whole, raw land inventory surveys were started earlier than residential lot surveys.

Frequency of Update

While there is some variation in the updating cycles of both lot and raw land inventory surveys, Table 9 shows that updates are generally quite frequent. Ninety-one percent of lot inventory surveys are updated at least annually, and of these, 19 percent are those Ontario municipalities which operate continual updating systems. Seventy-four percent of the inventory surveys of raw land are updated annually or more frequently.

It is apparent that the monitoring of the urban land supply process has become an established and regular activity for most of Canada's larger urban governments.

TABLE 8

AGE OF INVENTORY SURVEYS

Province	Raw Land Inventory In Years					Residential Lot Inventory In Years				
	>20	10-20	<10	Not Known	Total	>20	10-20	<10	Not Known	Total
Newfoundland	--	--	--	--	--	--	--	--	--	--
New Brunswick	--	--	1	--	1	--	1	--	--	1
Nova Scotia	--	1	--	--	1	--	--	--	--	--
Québec	1	2	9	--	12	1	--	6	1	8
Ontario	1	9	15	3	28	--	8	23	2	33
Manitoba	--	--	--	--	--	--	--	1	--	1
Saskatchewan	1	--	--	--	1	1	--	--	--	1
Alberta	1	2	1	1	5	1	2	1	--	4
British Columbia	1	2	7	--	10	--	3	5	1	9
Total	5	16	33	4	58	3	14	36	4	57
Cumulative Total	5	21	54	58	58	3	17	53	57	57

TABLE 9

FREQUENCY OF UPDATE OF INVENTORY SURVEYS

Province	RAW LAND INVENTORIES					RESIDENTIAL LOT INVENTORIES				
	# Conducting Inventories	Continually	Update Periodically		Not At All	# Conducting Inventories	Continually	Update Periodically		Not At All
			Reg.	Irreg.				Reg.	Irreg.	
Newfoundland	--	--	--	--	--	--	--	--	--	--
New Brunswick	1	--	--	--	1	1	--	--	--	1
Nova Scotia	1	--	1	--	--	--	--	--	--	--
Québec	12	1	8	3	--	8	3	3	2	--
Ontario	28	1	20	6	1	33	11	20	2	--
Manitoba	--	--	--	--	--	1	1	--	--	--
Saskatchewan	1	--	1	--	--	1	--	--	1	--
Alberta	5	--	5	--	--	4	--	4	--	--
British Columbia	10	--	6	4	--	9	1	8	--	--
Total	58	2	41	13	2	57	16	35	5	1

The difference between the updating periods in the survey of the two types of inventories indicate that municipalities need more current data concerning lots than data concerning raw land.

The municipalities generally do not publish the results of every inventory survey update. Ten percent of municipalities who conduct inventory surveys do not publish the updates at all. The majority publish on the same regular basis as they update their inventories - that is, annually.

The continual updating of lot inventories in a computerized information system, however, allows for the generation of reports on the status of the inventories as and when required by the municipality for subdivision approval decisions.

Format of Lot Inventory Surveys

Tables 10 and 11 show the format employed by municipalities to classify the lots surveyed. Seven development stage categories were identified. The trends among the municipalities conducting inventories generally differed from those planning to conduct inventories.

TABLE 10

STAGES OF RESIDENTIAL LOT DEVELOPMENT
FOR CLASSIFYING LOT INVENTORIES

MUNICIPALITIES CONDUCTING RESIDENTIAL LOT INVENTORIES			MUNICIPALITIES PLANNING TO CONDUCT RESIDENTIAL LOT INVENTORIES		
Number of Municipalities Conducting Residential Lot Inventories	57	--	Number of Municipalities Planning to Conduct Residential Lot Inventories	16	--
DEVELOPMENT STAGE CATEGORIES USED	#	%	DEVELOPMENT STAGE CATEGORIES PLANNED TO BE USED	#	%
Lots proposed in subdivisions	40	83.3	Lots in proposed subdivisions	10	62.5
Lots approved for development	42	87.5	Lots approved for development	11	68.8
Registered unserviced lots	26	54.2	Registered unserviced lots	10	62.5
Registered serviced lots	32	66.6	Registered serviced lots	13	81.3
Lots under construction	24	50.0	Lots under construction	8	50.0
Lots built on, but unoccupied	2	4.2	Lots built, but unoccupied	1	6.3
Lots created by zoning yearly	3	6.3			
Number which Categorize by Stage of Development	48	85.7	Number which Plan to Categorize by Stage of Development	16	100.0
Number which do not Categorize by Stage of Development	8	14.3	Number which do not plan to Categorize by Stage of Development	0	0.0
TOTAL RESPONDENTS	*56	100.0	TOTAL RESPONDENTS	16	100.0

* One Municipality did not answer this question

TABLE 11

TYPES OF HOUSING CLASSIFICATIONS
FOR CLASSIFYING LOT INVENTORIES

MUNICIPALITIES CONDUCTING RESIDENTIAL LOT INVENTORIES			MUNICIPALITIES PLANNING TO CONDUCT RESIDENTIAL LOT INVENTORIES		
Number of Municipalities Conducting Residential Lot Inventories	57	--	Number of Municipalities Planning to Conduct Residential Lot Inventories	16	--
TYPES OF HOUSING CLASSIFICATION USED	#	%	TYPES OF HOUSING CLASSIFICATION PLANNED TO BE USED	#	%
Very basic (high, medium, low density)	12	21.1	Very basic (high, medium, low density)	5	31.3
CMHC Standard (single, semi, row, apartment)	32	56.1	CMHC Standard (single, semi, row, apartment)	8	50.0
Zoning categories (R1, R2, R3, etc.)	19	33.3	Zoning categories (R1, R2, R3, etc.)	9	56.3
More elaborate system	5	8.8	More elaborate system	3	18.8
Use Housing Classifications	53	93.0	Plan to Use Housing Classifications	16	100.0
Do Not Use Housing Classifications	4	7.0	Do Not Plan to Use Housing Classifications	0	0.0
TOTAL RESPONDENTS	57	100.0	TOTAL RESPONDENTS	57	100.0

Most municipalities conducting surveys recorded the use of at least the following basic stages:

- lots proposed in subdivisions;

- lots approved for development; and

- registered serviced lots.

The first two categories were employed by more than 80 percent of the municipalities and the third category by 66.6 percent of the municipalities.

The trends among municipalities planning to conduct inventories were different. While about 60 to 70 percent of the municipalities indicated that they would monitor the first two categories of lot inventories, 81.3 percent said they would monitor registered serviced lots. This trend indicates that the key milestones of the subdivisions process are stages 1 through 4 of Table 10.

Four housing classifications were identified, as shown in Table 11. Ninety-three percent of municipalities conducting lot inventories use a housing classification system and all municipalities planning to conduct inventories indicated they would use one. The two most common classifications used are the CMHC standard and zoning categories. The practice of employing housing classifications in the lot inventories

demonstrates the importance given by municipalities to monitoring lot supply by residential unit type.

Uses of Lot Inventory Surveys

Table 12 summarizes the use of the lot inventory surveys by municipalities in subdivision approval decisions, to identify shortages and for infrastructure planning.

It appears that the primary reason for undertaking municipal lot inventory surveys is to assist in land supply and planning decisions. Eighty-two percent of municipalities who currently survey lot inventories do so to assist in infrastructure planning. This planning is presumably striving to ensure that an adequate quantity of serviced lots can be supplied and thus avoid costly over investment in infrastructure.

Identifying shortages in the lot approval process and providing input to the subdivision approval process were the other commonly cited reasons for conducting lot inventory surveys. Current land supply analysis procedures were employed by most municipalities, such as assessing the inventory of undeveloped lots against recent absorption rates and the use of various forms of flow-through analysis.

TABLE 12

USES OF THE LOT INVENTORY SURVEY

IN SUBDIVISION APPROVAL DECISIONS		TO IDENTIFY SHORTAGES IN THE LOT APPROVAL PROCESS		IN INFRASTRUCTURE PLANNING	
USE	NUMBER	USE	NUMBER	USE	NUMBER
Assessing the inventory of undeveloped lots against recent absorption rates	32	"Flow-through"analysis of the take-up of lots through the various stages recorded in the inventory	18	Assessing subregional patterns in the rates at which development areas are built	32
Assessing the inventory of undeveloped lots in the same subregional sector as the proposed subdivision against sectoral absorption rates	16	"Flow-through" analysis of the take-up of lots through the various stages of the main subregional growth areas	11	Projecting future take-up of services for the entire region	31
Assessing the inventory of undeveloped lots of the type in the proposed subdivision against recent absorption of that lot type	15	Assessment of the quantity of lots in each stage against "rules of thumb" for adequacy	33	Projecting future take-up of services for various subregional sectors	33
Assessing the inventory and absorption of the particular lot type in the particular subregion	13	Assessment of the quantities of lots in each stage, disaggregated to the main subregional growth areas	16	Planning capital projects for staging of development	4
		To identify delays in draft approved plans but not registered	1	Used in long range planning of transportation, education and other community services	3
		To assist in the staging of development policies	2	To assess rights-of-way requirements in development areas	1
Using Survey in Subdivision Approval Decisions	38	Using Survey to identify shortages in Lot Approval Process	38	Using Survey in Infrastructure Planning	47
Not Using Survey in Subdivision Approval Decisions	19	Not using Survey to identify shortages in Lot Approval Process	19	Not Using Survey in Infrastructure Planning	10
TOTAL RESPONDENTS	57	TOTAL RESPONDENTS	57	TOTAL RESPONDENTS	57

Sixty percent of the municipalities conducting residential lot inventories reported the use of the survey results by developers. Their impressions of the use were:

- to determine what is selling best;

- to support applications for zoning changes; and

- to identify their competition.

Other identified uses of the inventories were to coordinated population growth with lot supply and to determine potential development and growth areas for input into land use analysis for non-residential uses.

Finally, municipalities planning to conduct lot inventory surveys were asked for their purpose in doing the surveys. The principal reasons given were to assist in infrastructure planning and to assist local industry in planning and marketing.

6.1.1.3 Summary

According to the 87 large urban municipalities surveyed in this study, raw land and lot inventory surveys are widely used as a tool for managing the supply of residential development land. Over two-thirds of these municipalities carry out one or both of these surveys, with

clear aims for the improvement of the subdivision approval process and infrastructure planning.

The majority of the surveys were started within the last ten years. The most common reason given by municipalities for conducting lot inventories was to assist in infrastructure planning. Two other strong reasons were to pinpoint shortages in the land supply and to provide input for making subdivision approval decisions.

The study found that there is a high degree of interest among Canadian municipalities in monitoring residential land development through raw land and residential lot inventory surveys.

6.1.2 Land and Infrastructure Mapping Program

The Land and Infrastructure Mapping Program undertaken by Canada Mortgage and Housing Corporation surveys the supply of development land in 28 urban regions and publishes the information in detailed monitoring reports. The regions covered are listed in Table 13 and include all of Canada's largest cities as well as the key urban areas in smaller provinces. The following description of the features, methodology and uses of the program are based on Spurr's (1981) report of the program, and are updated through discussions with CMHC's Research Division.

TABLE 13

LIST OF CMHC MAPPING REPORTS

Atlantic	Quebec	Ontario	Prairies	British Columbia
St. John's	*Montreal	*Ottawa	*Winnipeg	Vancouver
Halifax	*Quebec	Oshawa	Regina	Victoria
Charlottetown	*Chicoutimi	Toronto	Saskatoon	
*Moncton	*Hull	Mississauga	Calgary	
Saint John		Hamilton	Edmonton	
*Fredericton		Kitchener		
		St. Catherines		
		London		
		Windsor		
		*Sudbury		
		Thunder Bay		

* indicates bilingual report (1980)

Source: Spurr, 1981

6.1.2.1 Features of the Program

This land supply monitoring program operates on a rotating basis whereby each of the listed cities is studied at least once every three years. The principal features of the data base are presented in Table 14. The data base, assembled from various planning and engineering offices and agencies, landowners, and limited field checks, is kept in a number of forms.

One is a map on which current land uses, infrastructure lines and services, planning and subdivision activity and political boundaries are indicated by films and tapes.

The second data base element is a list of individual parcels of land, their area and their ownership. Each parcel is assigned a number and the parcels are classified into one of three categories - publicly owned land with residential development potential, publicly owned land without residential development potential, and privately owned land.

Next are infrastructure tables. Separate lists are maintained for existing and proposed trunk sewer collectors, trunk water mains, and water and sewage treatment plants. The infrastructure is described in terms of design capacity and present loadings. By cross referencing these tables to the map, the data can be translated onto a display of regional infrastructure capacities.

TABLE 14

PRINCIPAL FEATURES OF LAND SUPPLY DATA BASE
OF CMHC LAND AND INFRASTRUCTURE MAPPING PROGRAM

Features Included	Form of Data
1. INFRASTRUCTURE - all existing or proposed sanitary sewers, storm sewers and water mains which pass through undeveloped land adjoining an urban area.	• alignment drawing, design and existing flows, timing where applicable.
2. PLANNING - all undeveloped areas zoned or designated for residential development in by-laws, ordinances, official or master plans (including annexation plans or servicing schemes).	• boundary map, official documentation of planning policy, timing where applicable.
3. SUBDIVISION PROPOSED - all parcels of undeveloped land which have been proposed to local authorities for subdivision.	• location, subdivision plan and details if available, name of owner
4. UNBUILT SUBDIVISION - all parcels of land which have been approved for subdivision but which are not yet built up.	• subdivision plan and details, name of owner.
5. DEVELOPER HOLDINGS - all parcels of land owned by residential development firms, housing contractors, known speculators, and major government holdings.	• location, area, name of owner
6. OTHER LAND - all parcels of land which have physical potential for residential development and are located near any of the above features (1-5) or are in an area which is deemed by our analysts to have strong development potential.	• location, area, name of owner

Source: Spurr, 1981

The "Land Supply Characteristics Table" lists each parcel of land ownership classified according to various planning and servicing characteristics. Some of the information that can be tabulated is shown in Table 15. They include data on sanitary sewers, water, drainage, subdivision plan approved/submitted, designated growth area and higher-density area. The land parcels are organized in sectors, usually based on municipal boundaries, so that they can be reviewed together and facilitate planning.

The program has developed a method to generate an estimate of the local land supply in various time periods. It is based on the assumption that the more development characteristics a site possesses, the closer it is to development. By examining the characteristics of each parcel in detail, it is possible to determine whether a parcel is 1, 2, 3 or x years away from development. By adding the parcels of each time period, it is possible to determine the total land supply for the respective time periods.

The program also provides a method for estimating land demand. The demand and supply levels can be compared to determine whether shortages may occur.

Several new elements are under development for possible inclusion in the overall program. In two regions, larger scale mapping has been employed to permit the depiction of smaller parcels of land (down to approximately 0.2 hectares). These maps are reproduced in the "urban

TABLE 15

CONTENTS OF THE LAND SUPPLY
CHARACTERISTICS TABLE

SANITARY SEWER ON SITE	Existing piped services, with appropriate capacity, pass through or along the boundary of the site (for large parcels, this definition will apply for a maximum parcel depth of 1,000 meters).
SANITARY SEWER NEAR SITE	Existing piped services, with appropriate capacity, are within 1,000 meters of the site and connection appears possible.
SANITARY SEWER PLANNED	A plan exists which would locate piped services, with appropriate capacity, on or near the site with connection possible.
WATER ON SITE	Existing piped services, with appropriate capacity, pass through or along the boundary of the site (for large parcels, this definition will apply for a maximum parcel depth of 1,000 meters).
WATER NEAR SITE OR PLANNED	Water main exists, or is proposed, with appropriate capacity within 1,000 meters of the site and connection appears possible.
DRAINAGE PROBLEM	Site with known high-water tables, marsh or swamp conditions, or large flat parcels without ditches, storm sewers or natural streamflow.
SUBDIVISION PLAN APPROVED	A plan of subdivision for development of the site has been approved or registered.
SUBDIVISION PLAN SUBMITTED	A completed application for a plan of subdivision for the site has been submitted to the planning approval authority.
DESIGNATED GROWTH AREA	Area identified for future residential development by: (a) existing Official Plans (b) Municipal/Regional general plans or policy statements (c) existing residential zoning by-laws.
HIGHER-DENSITY AREA	Area where residential development greater than 35 housing units per gross hectare is proposed (this generally includes row houses and apartments).

Source: Spurr, 1981.

atlas" type of publication which is easily transportable and further aids its usefulness. In several cases the monitoring work has been undertaken as a joint project with a local government, and discussions are underway with some industry associations and provincial agencies which should lead to much more of this type of joint venturing.

The principal outputs of the program are the standard mapping reports published for the 28 urban regions listed in Table 13. These reports are given to the municipal and provincial governments involved in the respective regions, and sold to local industry and the general public. Certain amounts of backup data are maintained by CMHC and its contractors, but generally, the entire information base is published.

6.1.2.2 Use of the Data Base

The land supply mapping information is used by various public and private organizations and individuals. An illustration of the degree of interest is seen in the Ottawa-Carleton region, where letters promoting the land mapping study were sent to 126 builders, developers, planners, realtors and appraisers. The response was 65 sales. Other applications have ranged from contributions to the regional housing market studies program in Ontario, the monitoring of the impact of Bill 90 on the urban land supply in Quebec, and providing Environment Canada with specialized urban data from Windsor, Ontario to input into the Canada Land Data System. In the latter, a computerized system, the project was able to examine relationships between various supply and demand factors.

6.1.3 Landsat Imagery Mapping

A method of land supply monitoring that is in early stages of development is the use of Landsat imagery. The use of Landsat digital data to detect land cover change in urban environments was recently investigated by Howarth and Boasson (1983). This technique monitors change in land inventories by comparing Landsat multispectoral scanner (MSS) data from one or more dates. The imagery from two dates are overlaid to generate image enhancements and are displayed on a CRT monitor for analysis. To accurately register imagery from two dates, Landsat data is produced by the Digital Image Correction System by which the data are resampled to provide 50 x 50 m2 pixels. The authors presented the capabilities of three digital enhancements in their study of change at the urban/rural fringe of Hamilton, Ontario. They were overlay, ratio and vegetation index procedures.

The overlay procedure overlays an band from one date with the same band from the second date. Displayed on the CRT monitor, one band is assigned the red colour gun and the other is assigned the blue and green colour guns. Any areas that have changed will be highlighted in one of the colours. The areas that have no change will be displayed in grey. The procedure clearly identifies new construction sites and new residential areas.

In the ratio procedure, the pixels from one date are ratioed with that of the second date using the same band in each case. If there is no

change in land cover, the digital value for both dates is the same, giving a ratio of 1.0 and a medium grey tone. Areas of change will be displayed in either lighter or darker tones and will have values greater or less than 1.0. It was found that band 5 ratio appears to be sensitive to cultural features (e.g. construction sites) while band 7 ratio emphasizes water differences.

The third procedure calculates a vegetation index for each data on a pixel by pixel basis, using the normalized difference index (band 7 - band 5)/(band 7 + band 5). Areas of vegetation appear in light tones while non-vegetated areas (roads, buildings) appear dark. The vegetation changes are highlighted by assigning the vegetation index results from each date to different colour guns on the CRT monitor and applying gains and offsets.

A summary of the band combinations and colour guns used for each of the three enhancements is presented in Table 16.

Their study results indicate that simple overlay of band 5 images from two dates is "a simple and very effective means of identifying change due to urban activities". The ratio enhance could only emphasize areas of major change because the lack of contrast and poor change detection in band 7. The use of the vegetation index is excellent for identifying changes from vegetated to non-vegetated uses and vice versa. It also provides a clear definition of the major road networks and the built up areas.

TABLE 16

SUMMARY OF BAND AND COLOUR COMBINATIONS USED TO PRODUCE THE ENHANCEMENTS

Enhancement	BAND COMBINATIONS Blue & Green Guns	Red Guns
Overlay	5(1974)	5(1978)
Ratio	$\frac{7(1978)}{7(1974)}$	$\frac{5(1978)}{5(1974)}$
Vegetation Index	$\frac{7-5}{7+5}$ (1978)	

Source: Howarth P. and Boasson (1983).

Ongoing research by Martin (1984) is employing the VAX/DIPIX image analysis system to examine land cover changes on the Toronto fringe. Landsat imagery is being analysed to do two tasks:

(1) to update a land cover classification produced form 1961, 1966 and 1971 using conventional air photo interpretation and produce Landsat based classifications for 1974, 1978 and 1982; and

(2) to identify land which has shifted from non-urban to urban use by means of enhancing images through computer analysis.

6.2 Evaluation of the Supply Monitoring Techniques

In order to evaluate the usefulness of each of the above supply monitoring techniques, it is necessary to first determine the purpose of keeping an inventory, what is the inventory problem and what information should be provided by a land inventory monitoring technique for it to be useful to a municipality.

This section seeks to first answer these questions by discussing some concepts on inventory and how data on inventories can be used to analyse adequacy of supply, market concentration and the supply process.

The instruments are subsequently evaluated on the extent to which they provide the required inventory information for inventory analysis.

6.2.1 Basic Concepts on Inventories

This section discussed some basic concepts on inventories such as why are inventories kept, what is the inventory problem, how to determine the optimal size of the inventory and how to control the inventory.

Three basic reasons have been identified for keeping inventories. First is that they act as a safety mechanism to compensate for uncertainties in the timing and volume of supply and demand, as a buffer between supply and demand, and as a buffer between supply and demand that takes place at different rates (Anderson and Heponstall, 1971, p. 67). This is particularly true for urban land development because the developer relies on the land dealer and farmer for raw land and on the municipal authorities for supply of trunk services and subdivision approval. The builder on the other hand relies on the developer for the supply of serviced lots. The demand might exceed the rate of supply and inventories serve to cushion against fluctuations of demand.

The second reason is the need for work-in-process inventory. Firms have found that a stock equal to the amount consumed over the lead time is necessary to ensure that shortages do not occur.

Lastly, the firm may incur costs for not carrying sufficient inventory such as losing out on sales, readjustment costs and losses of quantity discounts. For the municipality, a shortage of trunk servicing would

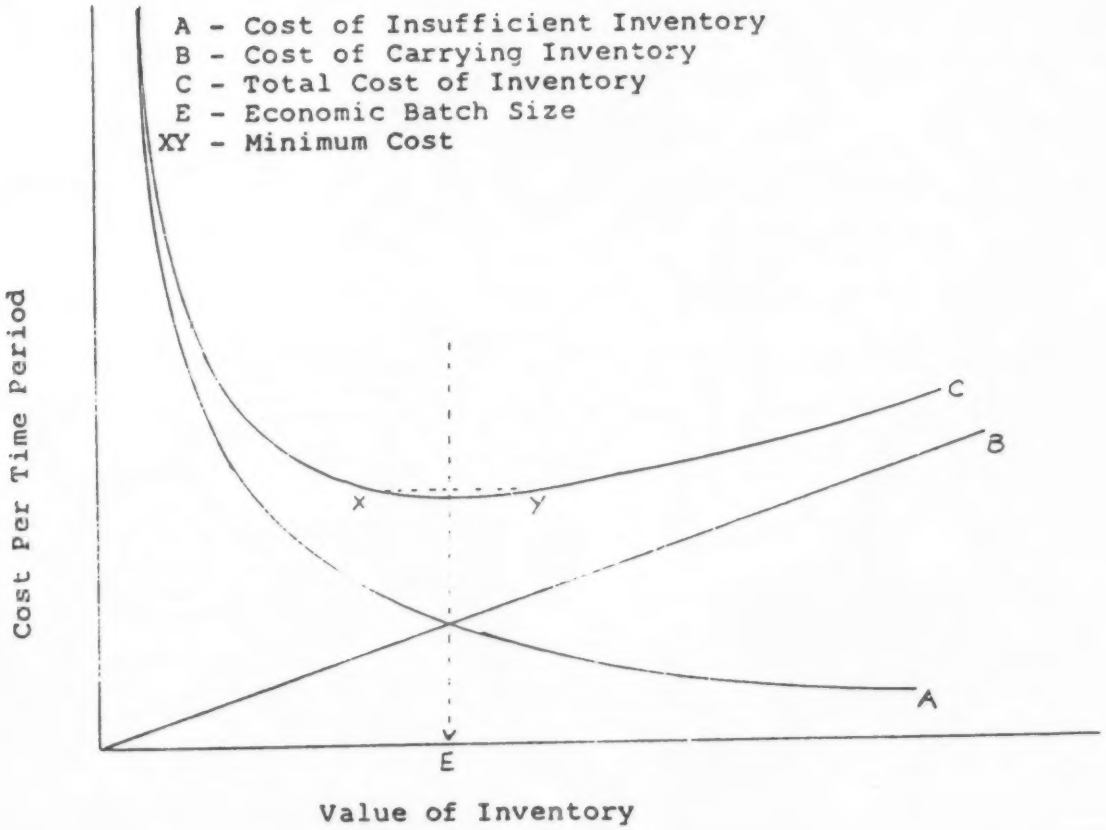
mean a bottleneck in the development process and housing shortages with attendant repercussions such as crowding and escalating rents.

The analysis of the inventory problem is fundamentally one of evaluating opposing costs with the objective of minimizing total costs involved in maintaining inventories. Inventory costs arise from procurement costs, costs of ordering, stockage costs,and the cost of carrying and not carrying sufficient inventory.

Because it costs money to maintain an inventory, the financial manager will try to keep the inventory at the optimum level. Keeping the inventory at this optimal level not only reduces carrying charges but also ensures that as little as possible of the organization's capital is tied up in inventory. Figure 13 illustrates how the optimum inventory level is determined. B is the cost of carrying inventory. The larger the inventory, the greater will be the inventory cost. A is the cost of not carrying sufficient inventory. By carrying a small inventory the higher chances of having insufficient inventory results in a higher inventory cost per time period. C is the total cost of inventory and is lowest at E, the intersection of A and B. This is the economic batch size or the optimal inventory level. The curve of C is relatively flat at this level, signifying that a small departure from E does not increase costs significantly. This is important because inventories cannot be kept constant (or they would not be needed in the first place). Figure 13 shows that the cost of maintaining an inventory will not be very much above the minimum level if the inventory fluctuated between the range of X and Y.

FIGURE 13

ESTABLISHING MINIMUM TOTAL COST OF INVENTORY



Source: Anderson and Heptonstall, 1970, p. 70
Battersby, 1970.

Figure 14 shows the common fluctuations in stock levels. The economic batch size is Q. The rate of usage is assumed to be constant and the stock replenished when it falls to reorder level. Lead time is the period between the time a reorder is made and the time it is received. Because it is not possible to accurately predict usage nor the arrival of new stock, a safety stock is carried to prevent a stock out.

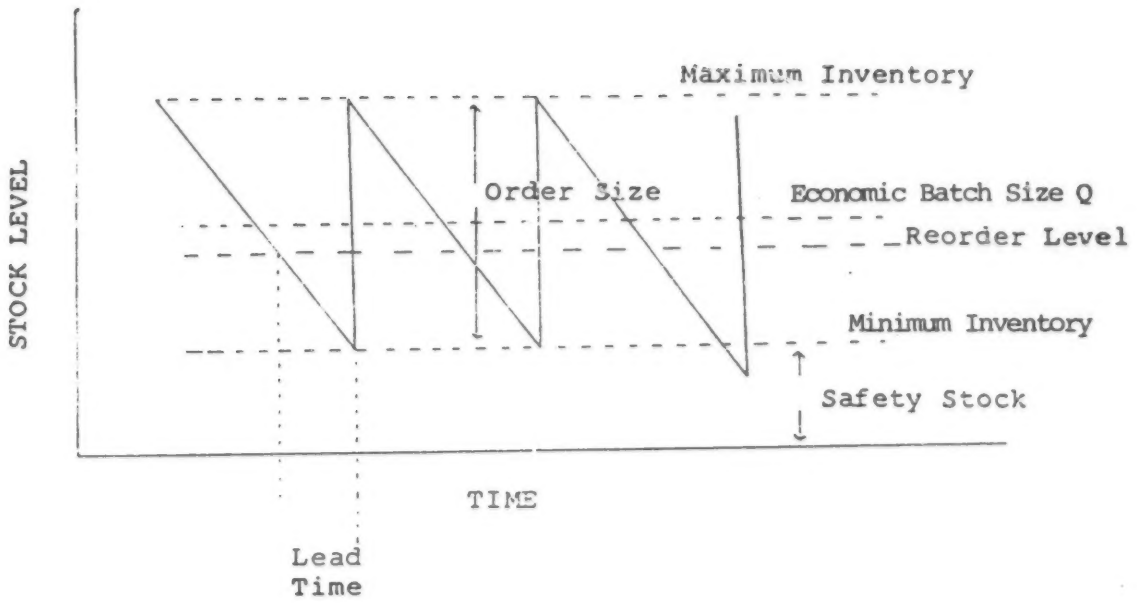
The next question is how to control inventories. There are two basic inventory control systems. The first is the fixed order quantity system in which a fixed quantity is ordered when the stock reaches the reorder level. The other is the fixed order cycle system in which the reorder points are fixed. The quantity ordered varies according to the level of the stock. In practice, the use of rule-of-thumb methods devised over the years are often used because of the difficulty of obtaining inputs to these formulae.

In land development, two common rule-of-thumb methods of inventory control useful to the production process are minimum turnover and maximum-minimum controls. Turnover is defined as the annual usage of an item divided by its average inventory. If the turnover of five times is found to have produced previously acceptable results, it may be specified as the turnover ratio to be maintained. The minimum-maximum control method specifies that the inventory should never exceed x units or dollars or fall below y units or dollars.

The inventory problem facing municipal planners is to determine the optimal supply level for each land inventory. For the inventory of

FIGURE 14

COMMON FLUCTUATIONS IN STOCK



Source: Battersby, 1970; Biegal, 1971.

development land over which they have direct control, i.e. land provided with trunk services, the planners have to determine what (water or sewage services, roads), when and how much has to be installed. These decisions have to be made in the context of the rates of absorption (current and projected), the interest rates and the economies of scale in the construction of these services.

In addition, the planners also need to be aware of the functioning of the inventory control systems of the land and lot inventories owned by the developers. This requires that the planners not only know the changes in each of the inventories through close monitoring but also be adept in the use of the data for supply analysis purposes. The next section presents the main research in the area of land inventory analysis that is useful for assisting a municipality in land supply adequacy analysis.

6.2.2 Land Inventory Analysis

The following presents research that has been conducted using land inventory data. The purpose of the review is to demonstrate the kinds of land inventory data collected and the type of inventory analysis that can be conducted to determine supply adequacy, market demand, developer lot production decision behaviour, and the impact of public land supply management decisions on supply.

As examples of the different sets of land inventories that are created by the subdivision process, reference is made to the land inventory flow models developed by Eger (1977) for Quebec and Unsoy (1982) for Ontario. These models defined not only the "pools" or inventories of land created but also the lead time required to move land from one inventory to the next.

Unsoy (1982) in her study of land inventories in residential development in Kitchener, Ontario defined six inventories of development land. They were assembled raw developable land, land under application for subdivision approval, land approved for subdivision development, registered land, serviced land and lots with newly completed dwellings. The lead time, i.e. the time period taken for land to move from one stage to the next period was determined and presented in Table 17. It is shown that the time taken to obtain subdivision approval was between 10 to 12 months and another 5 to 10 months before plan registration.

Using annual data on the supply levels of each inventory from 1967 to 1977, she analysed the inventory supply decisions of the three major developers and the municipality. From the analysis of the developers decisions on stock flow, average stock levels and inventory control systems, the study attempted to define developer supply strategies, in particular, turnover ratios maintained by the respective developers.

The analysis of land supply management decisions of the municipality as effected through a lengthy subdivision approval was found to have a direct impact on developer lot supply behaviour.

TABLE 17

TIME TAKEN AND LAND INVENTORIES IN THE SUBDIVISION DEVELOPMENT PROCESS, CITY OF KITCHENER, 1977

Number of Months	Steps	Land Inventories
12 - 24	Purchase Land Preliminary Plan	Assembled Raw Development Land
10 - 12	Plan Submission Plan Draft Approval	Land Under Application for Subdivision Approval
5 - 10	Subdivision Agreement and Zoning By-Law Amendment Plan Formal Approval	Land Approved for Subdivision Development
	Plan Registration	Registration Land
6 - 9	Site Services Install	Serviced Land
5 - 8	Building Permit Construction of Dwelling	Lot with Newly Completed Dwelling

(Total development lapsed time is equal 26 - 39 months)

Source: Derived from Unsoy, 1982.

The study attempted to define an optimal level of supply for each land inventory (stage of development as well as type housing lot/site) based on developer turnover ratios, average lead times, municipal turnover ratio policy and the views of the housing industry and Canada Mortgage and Housing Corporation on inventory sizes. The optimal land inventories as defined for submission, approval, registration and service of lots respectively are shown in Table 18.

Using data from the Land and Infrastructure Mapping Program, the Land Assembly and New Communities Division of Canada Mortgage and Housing Corporation examined the supply characteristics of land for urban development in 17 cities, against their respective demand for residential land. Subdivision land was analysed for availability of services and subdivision planning as of the summer 1977. From this comparative analysis, the study established a yardstick in mean demand years to measure the adequacy of supply (Canada Mortgage and Housing Corporation, 1978).

Eger (1977) developed a land inventory model to study the effect of the subdivision process on the price of raw land and land available for servicing in the Montreal area land market. On the basis of his analysis of the subdivision development process, he suggested four distinct inventory pools of land be monitored, as shown in Table 19. They were raw land inventory, inventory of land available for servicing, serviced land inventory and land inventory of completed but unoccupied housing. He showed that each inventory could be expected to change in price according to its demand and supply (Figure 15).

TABLE 18

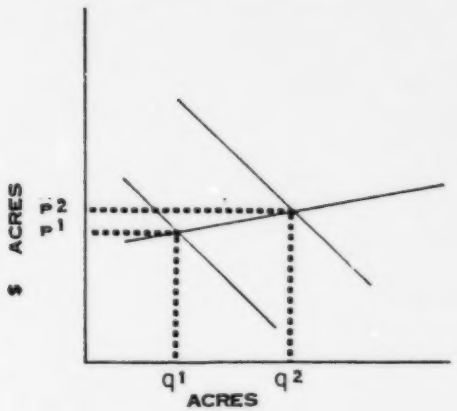
OPTIMAL LAND INVENTORIES, KITCHENER

Land Inventories	Optimal Range of Inventory Size (years supply)	Average Lead Time for Reorders (years)	Total Lead Time to House Construction (years)
1. Submitted Lots	3.3 - 4.2	1.5	4.0
2. Approved Lots	2.3 - 3.0	1.2	2.5
3. Registered Lots	2.4 - 3.0	0.8	1.3
4. Services Lots	2.0 - 2.5	0.5	0.5

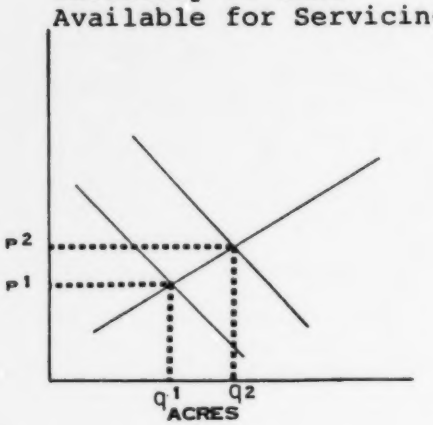
FIGURE 15

EXPECTED RELATIONSHIP IN FOUR LEVELS OF INVENTORY IN SUBDIVISION PROCESS, TO CHANGES IN DEMAND

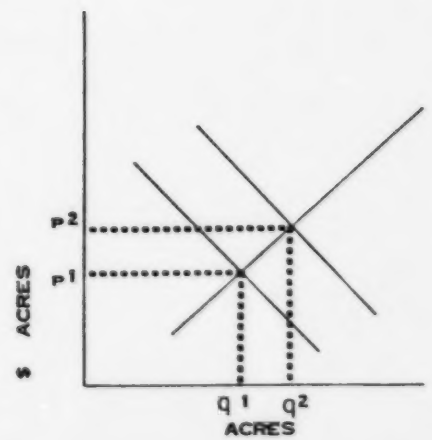
Raw Land Inventory



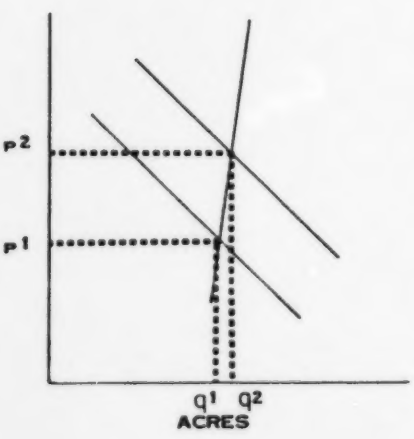
Inventory of Land Available for Servicing



Inventory of Serviced Land



Inventory of Land in Completed but Unoccupied New Housing



Source: Eger, 1977, p. 45.

Table 19 shows that the production process was much shorter than in Ontario. The lead time for subdivision plan approval once the Master Plan has been approved was only 6 to 14 weeks. The typology of land inventories were different from that in Ontario mainly because the municipality was responsible for raising the funds for installing site services. On registering the plan, the developer requests for services and can, on the average, begin house construction 25 - 49 weeks or 6 - 12 months after plan approval (Eger, 1977).

Using the direction of changes in house prices and the proportion of house prices and the proportion of houses sold through the Multiple Listing Service to total houses listed, Eger identified 1969-1972 as a period of excess supply and 1974-1976 as one of excess demand. His findings showed there was a direct relationship between a change in the price of raw land and the years of supply of subdivided land. The study inferred that the inventory of serviced lots was maintained at too low a level because of the dramatic increase in prices during the excess demand period. The sufficiency in subdivided lots can therefore affect the price of raw land.

A municipal government study has attempted to use lot data to demonstrate where lot supply has been restricted along the production process. In an empirical study, the City of Regina (1977) recorded the inventory of developable lots (lots that have been approved and therefore can be registered by developers for development) and the inventory of registered lots between 1965 and 1977. Fluctuations in lot prices

TABLE 19

TIME TAKEN AND LAND INVENTORIES
IN SUBDIVISION DEVELOPMENT PROCESS, BOUCHERVILLE, QUEBEC

Number of Weeks	Steps	Land Inventories
2 - 12	Submit Master Plan	Raw Land
2 - 5	Council Discussions	Raw Land
2 - 6	Submit Subdivision Plan	Raw Land
4 - 8	Council Approval	
4 - 8	Registration with Dept. of Lands and Forests	Land Available for Servicing (approved land)
2 - 4	Request for Services	Land Available for Servicing (approved land)
1 - 2	Council Approves Services	Land Available for Servicing (approved land)
1 - 2	City Engineering Plans of Public Service	Land Available for Servicing (approved land)
4 - 8	Plans Approved by Provincial Environmental Studies	Land Available for Servicing (approved land)
2 - 4	Council Approval to Raise Funds	Land Available for Servicing (approved land)
6 - 12	Approval for Loan for Servicing	Land Available for Servicing (approved land)
4 - 8	Construction by Municipality of Services	Serviced Land
1	Building Permits	Serviced Land
4 - 8	House Construction	Land with Completed but Unoccupied Housing

(Total lapsed time 35 - 80 weeks or 9 - 20 months)

Source: After Eger, 1979.

were related to lot prices which were observed to have increased significantly since 1972.

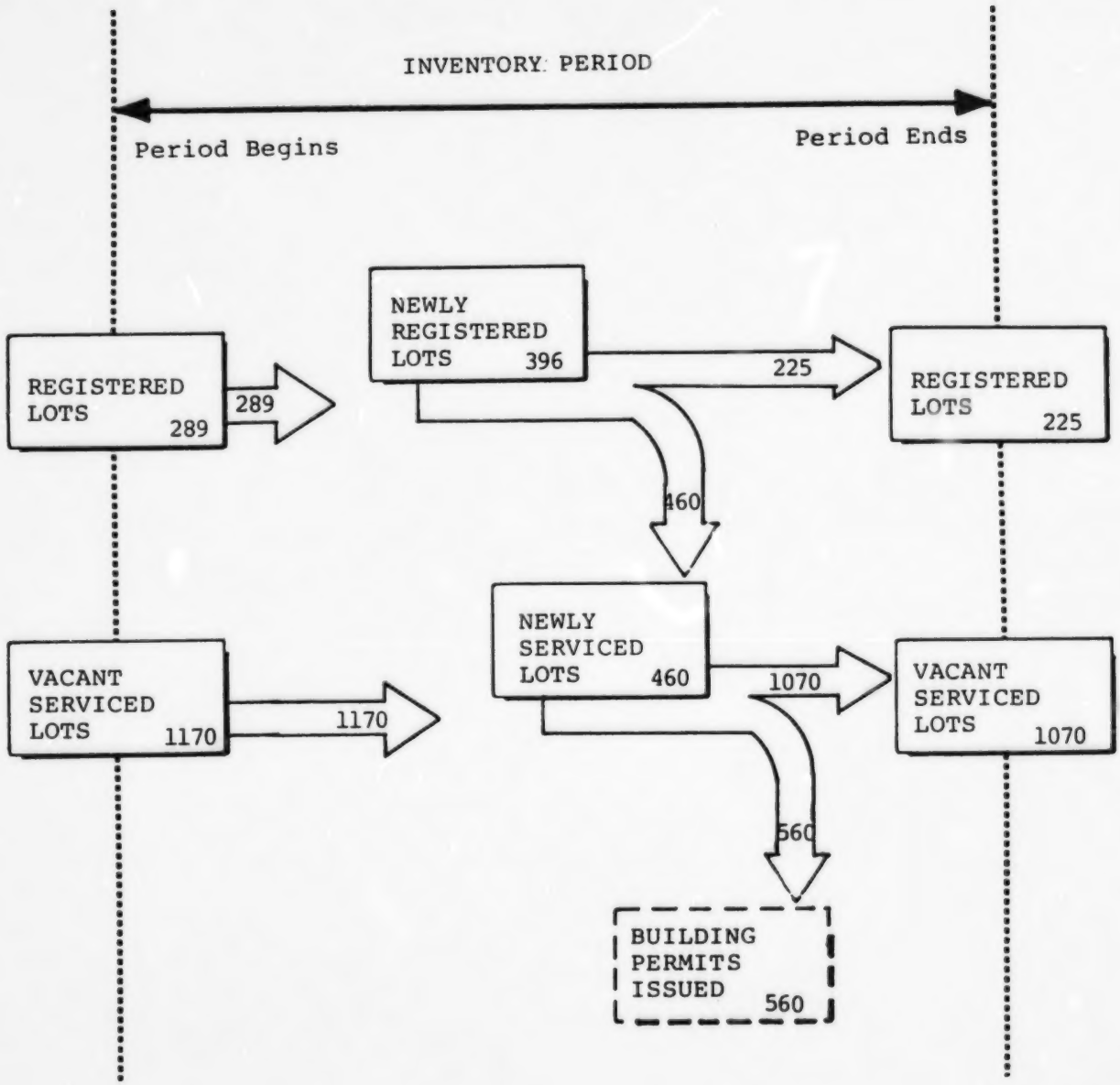
The analysis of the inventory records showed the planners that there were five times the supply of registered lots to the rate of building permits issued over the period and that the subdivision approval process had an average lead time of only three months. Any shortages felt in 1974, it was argued, were due to the restriction in supply by developers and not the city's subdivision approval decisions.

Flood (1979) studied the decision patterns on lot registration, lot servicing and building on serviced lots in Edmonton, from 1970 to 1976. His conceptualization of the lot supply inventory is presented in Figure 16. He analysed the supply of serviced lots in relation to the volume of lots used up over six monthly periods and concluded that there had been an excess of 186 percent over the rate of absorption during the six year period, with a minimum of 99 to 220 percent excess in nine six-monthly periods and a maximum of 250 to 400 percent excess in three six-monthly periods.

Despite these supply levels, he found that lot and house prices skyrocketed in Edmonton over the same period. He therefore concluded that a surplus of serviced lots may be physically available, without forming an active part of the market (Flood, 1979, p. 34).

FIGURE 16

THE EDMONTON LOT SUPPLY INVENTORY
(PROCESS SCHEMATIC)



Source: Flood, 1977, p. 28

Some reasons that may account for rising prices prices while there is a surplus of lots could be locational differences, the need for large inventories and an anticipation of strong market demand. Demand might be high in a specific sector or certain communities and the developers might have been able to charge higher prices in those communities despite large inventories existing in other communities. Also, it may be developers' and builders' policy to operate with an inventory size of development lots of two to three times the level of usage because of the production lead time required. Lastly, in a city undergoing rapid growth, the homebuyers are willing to pay high prices and the developers may be able to raise prices independent of the size of their inventories. It is conceivable that one or more of these reasons could account for the trends in prices and land inventories observed by Flood for the Edmonton land market between 1970 and 1976.

Ratcliffe and Hamilton (1972) using a historical approach analysed subdivision and lot development trends in Vancouver from 1954 to 1970 for speculative tendencies. Year by year development land sales transactions and lots in subdivision developments were inventoried and analysed for turnover activity. They found that the ratio of acreage sold for development to acres subdivided was approximately 1.77 to 1.00 in West Vancouver and at no time were the acres sold less than acres required to meet subdivision needs. It was observed that as developers were forced to cover servicing costs, the incidence of premature development declined and that 66.8 percent of lots in Vancouver were developed within two years of subdivision.

Finally, a study by Davies and Porter (1977) attempted to determine the dynamics of the rate of subdivision development by using lot data in a longitudinal study. The authors formulated an equation in which they postulated that the flow of lots was a function of the expected profitability from subdivision development.

The number of lots created, in a municipality by subdivision approval, was expressed as a function of the price of vacant, approved serviced lots, the ratio of housing starts to total stock of housing, the prime rate of interest, the wage rate, the cost of materials and the price of raw land.

6.2.3 Usefulness of Instruments

Figure 3 has shown that land passes through various stages in the subdivision development process. The two inventory land models presented in Section 6.2.2 demonstrated how the "pools" of development land created is a function of the urban land supply process and that the size of the inventory will vary according to the production lead time.

As shown in Section 6.1 and 6.2.2, lot data can be employed in a variety of analysis of the performance of the lot supply management system. They can be used to determine adequacy of supply, to identify market concentration patterns and bottlenecks in the land supply process for the municipal authorities. Land developers can use the

inventory data to guide their marketing and land development decisions.

The usefulness of a monitoring technique to a municipality will depend on its purpose for conducting an inventory, the type and rate of subdivision development experienced and last but not least, the financial resources available for monitoring the inventories.

Of the three monitoring techniques, the data from the Land and Infrastructure Mapping Program is found to be the most comprehensive. It provides supply data for both development land as well as potentially developable land. It also contains detailed data on infrastructure availability. It is the only technique that records ownership of developable land.

Its drawback, however, is that it is updated only once a year and does not necessarily provide the up-to-date picture of the land supply in the municipality that is necessary to assist the municipality in making subdivision approval decisions.

Lot inventory surveys, however, are superior to the Land and Infrastructure Mapping Program, particularly those systems that are filed in a computerized information system and records are continually updated. The increasing prevalence of the use of this monitoring technique, as shown by the results of our questionnaire survey, suggests that more and more and more municipalities are realizing the importance of having

lot inventory data on which they can make informed land supply management decisions.

From the review of research analysing lot supply, it is evident that a useful parameter to be included in lot inventory surveys is lot prices for the various types of housing, since lot prices are considered as an indicator of supply adequacy.

The use of Landsat imagery is somewhat limited because it reflects only general spatial changes in land cover. The changes in the subdivision process that can be monitored by this technique are the installation of site services and house construction. However, although it does not capture all the changes in the flow of land through subdivision development, or the land inventory levels in detail, this technique can present a regular and inexpensive way of monitoring land-use change in subdivisions under development.

This instrument is particularly useful for government agencies that are responsible for monitoring land use developments over large administrative areas where the rate of development does not justify the cost of conducting regular lot inventory surveys. It is also useful in providing an overview of developments in the urban fringe for large metropolitan regions, such as Toronto and Vancouver. The advantages of using Landsat imagery for land supply monitoring are frequent measurements of change at low cost, speed of analysis and minimization of human error associated with using teams of photo interpreters.

Used in conjunction with the Land and Infrastructure Mapping Program, it might suffice the land monitoring needs of a municipality with limited planning resources and, where approved subdivisions are scattered extensively.

7.0 INSTRUMENTS FOR SUPPLYING LAND

A means by which the municipality can directly add to the supply of urban land is by public land assembly and development programs. Through such programs, the municipality can supplement the supply of urban land provided by land developers as well as be able to exert greater influence in, not only the quantity, but the rate, type and timing of development and the price of subdivision lots as well.

Section 7.1 defines and examines the features of this land supply management instrument and Section 7.2 evaluates its usefulness on the basis of Canadian experience.

7.1 Public Land Assembly and Development

Public land assembly refers to the small and large scale public acquisition of land in advance of development, for residential and other purposes. The land acquired may be developed by the government itself or in partnership with private developers or may be privately developed. The land may be sold or leased for development (Ontario Task Force on Housing Policy, 1973, p.39).

7.1.1 Objectives and Principles

Hamilton (1974) who critically reviewed this instrument, summarized three general sets of objectives commonly given for public land assembly from the literature. They are:

(1) Planning Objective: Control of the nature, timing and location of new development;

(2) Price Objective: The argument advanced is that land prices can be effectively reduced through public ownership of land banks; and

(3) Profit Objective: Allocation of profits arising from development. The objective is to recover a portion of the profits for the public authorities. The objective is based on the assumption that the present pricing mechanism does not compensate public authorities for their contribution to enhance land values (Hamilton, 1974, pp.11-12).

The planning and price objectives are considered primary and the profit objective, secondary. Hamilton proceeds to explain how the three objectives are to some extent contradictory and that the benefits in the final analysis illusionary because they are achieved through hidden costs and subsidies. He contends that poorly planned urban areas are not the fault of developers but planners who were enforcing the planning controls. There is thus no guarantee that public land banking would produce better planning. He adds that increasing the supply of serviced land will not immediately decrease housing prices because the desired effect can only be achieved over the long term.

His argument is that public land assembly is a form of economic planning and thus can be justified on grounds of efficiency in achieving desirable long run goals. The benefits can only be achieved, he adds,

if they are based on a carefully structured administration and well conceived policies (Hamilton, 1974, pp. 18-19).

The principles for the operation of public land assembly which can affect the performance of the land bank concern are:

(1) the control of land banks;

(2) the share of the market;

(3) advanced purchasing;

(4) landbanks and infrastructure planning; and

(5) pricing policies.

Principle (1) is closely related to (4). It is recommended that the administrative control of the land-bank be kept separate from municipal government so that the decisions made are in the long term interest of the land-bank and not in the short term interests of politicians (Hamilton, 1974, p. 20).

There is no clear answer to the question of share of the market. It has been suggested that public land holdings need not exceed 30 percent of the urban area but there is no hard evidence to support it (Pearson, 1975, p. 14). Pearson also points out that there are cases where

market shares of only 10-15 percent have sufficed. In Saskatoon, where land-banking had been successful, the land-bank accounted for 80 percent of the new residential development (Ravis, 1972, p. 46).

With respect to how much inventory should be purchased, an inventory of 10 to 15 years supply has been suggested (Pearson, 1973, p. 14), while Hamilton says that the range is usually between 5 to 20 years (Hamilton, 1974, p. 21). Saskatoon was reported to have an inventory of 20 years supply, while Red Deer, Alberta only buys 5 years ahead of need (Ravis, 1972; Watson, 1967). This shows the size of the inventory depends on local market conditions.

Where the new subdivisions of land-bank account for a very large share of the new development areas, planning the location of new infrastructure may not involve the choice of granting approval to the land-bank over a few private developments. Where the land-bank is only one of a number of "developers", the interest of good planning should prevail.

The final principle, pricing policies, is perhaps the most controversial. Where the scale of ownership by a public land-bank is extensive, for example in Red Deer and Saskatoon, the City has been able to establish the market price (Ravis, 1972, p. 85). However, in Hamilton, where the public land-bank only accounts for a small portion of the market, it would be found that lot sales from the land bank had only a negligible effect on price levels in the Hamilton area (Pearson, 1973). It has been recommended that if the intention is to deflate lot prices

generally, land-banks should be able to release large quantities of lots at the market price. If the intention is to assist the lower income potential home buyer, then certain requirements for participation should be imposed. Controls to discourage speculation have also been suggested but it was acknowledged that they may be difficult to administer (Reschenthaler et al., 1976).

7.1.2 Public Land Development Programs

Public land assembly and development programs have been administered by federal, provincial and municipal governments.

At the federal level, Canada Mortgage and Housing Corporation, the federal housing agency assembled land under Section 40 of the National Housing Act and made loans to the other levels of governments to assemble land under Section 42 of the Act. Table 20 shows that between 1950 and 1979, a total of 10,974 hectares were acquired by CMHC under 57 projects in eight provinces, while loans to assemble a total of 14,962 hectares of raw land were made to the provinces and Northwest Territories, with the exception of Quebec. [3]

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3 For a survey of the activity of federal land banks, see Spurr (1976).

TABLE 20

LAND ASSEMBLY FINANCED UNDER THE NATIONAL HOUSING ACT, CANADA BY AREA (1950 - 1979)

Period and Area		Federal-Provincial Land Assembly Project (Section 40) Land Holdings		Period and Area		Expenditures and Outstanding Commitments (Section 42) Raw Land	
		Number of Projects	Hectares			Number of Hectares	100% Costs $000
1950-1979	Newfoundland	6	589	1967-1979	Newfoundland	878	3,536
	Prince Edward Island	2	71		Prince Edward Island	92	628
	Nova Scotia	6	1,671		Nova Scotia	826	6,203
	New Brunswick	2	285		New Brunswick	584	2,233
	Quebec	-	---		Quebec	---	---
	Ontario	29	7,289		Ontario	3,656	39,581
	Manitoba	1	122		Manitoba	2,998	18,908
	Saskatchewan	7	658		Saskatchewan	1,125	3,917
	Alberta	-	---		Alberta	2,931	12,574
	British Columbia	4	289		British Columbia	1,759	5,285
	Yukon	-	---		Yukon	---	---
	Northwest Territories	-	---		Northwest Territories	113	221
	Canada	57	10,974			14,962	93,086

Source: Canadian Housing Statistics, 1979, Table 71, p. 63.

While the federal land program has been discontinued, the programs at the provincial level remain active. Table 21 summarizes the current provincial land assembly and development activities. It is shown that while Prince Edward Island and New Brunswick are only selling lots from developed projects, all the other provinces are either continuing to develop new lots or have holdings held in land-banks. Only Alberta and Saskatchewan finance municipal land assemblies in their program.

The level of activity in land assembly and development among municipalities varies considerably. Some have active land assembly programs while others have the program as an adjunct to social housing projects, where they purchase land for the construction of public housing.

Cities with long standing land assembly programs include Saskatoon, Lethbridge, Red Deer, Edmonton and the District of North Vancouver. [4] Large cities like Vancouver, Toronto, Ottawa and Calgary are reported to have assembled and developed sites only for their social housing programs (CMHC, 1983).

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4 For detailed information on these land-banks refer to Ravis (1972), Ward (1975), Parsons and Budke (1972), and Cook (1977).

TABLE 21

SUMMARY OF CURRENT PROVINCIAL PUBLIC
LAND ASSEMBLY AND DEVELOPMENT ACTIVITY

Province	New Developments	Old Developments	Held in Land Bank	Finance Municipal Land Assembly
Newfoundland	x (Mount Pearl)	x	-	-
Nova Scotia	x (Halifax-Dartmouth)	x	-	-
Prince Edward Island	-	x	-	-
New Brunswick	-	x	-	-
Ontario	x (Malvern, Kanata, Kitchener London, Guelph)	x	-	-
Manitoba	-	x	x (Winnipeg, Brandon)	-
Saskatchewan	x	x	-	x
Alberta	x (Mill Woods, For McMurray)	-	x (Edmonton)	x
British Columbia	x (Vancouver, Victoria, Resource towns - Tumbler Ridge, Mackenzie)	x	-	-

Source: Derived from Canada Mortgage and Housing Corporation, 1983.

7.2 Evaluation of the Technique

As an instrument of land supply technique, public assembly and development banking can provide the municipality with a means of increasing the supply of urban land. In order for the program to be effective in keeping land prices low, the supply should be substantial. As shown by the Saskatoon experience, the land-bank, because of its scale, has been able to keep land prices in the city down (Ward, 1975, p. 69).

However, if the market share is not significant, additional controls should be put in place to ensure that the lots supplied at a price below the market rate should benefit the target groups. In the Mill Woods Land-Bank in Edmonton, for example, the lots were being sold at 20 percent below market price (Ward, 1975, p. 70). However, because of the shortage of serviced lots in the rest of Edmonton, people bought lots in Mill Woods on speculation.

The lots in Mill Woods were sold by lottery rather than by income qualification with no controls imposed (Reschenthaler et al., 1976). While it may cause hardship to impose a minimum occupancy period on buyers, it is not inequitable to restrict the disposal of the property on the market. If the properties could only be sold back to the land-bank at a fair price, for example, 20 percent below the current market value, it would eliminate speculators and free the property to bona fide house buyers. Although this would mean additional administration on the part of the land-bank, it would also mean more effective results for the program.

Public land development has not, from experience, meant better planning in terms of timing of development. The subdivision developments undertaken by Ontario Housing Corporation in the Kitchener area did not prove to be more efficient than those by private developers in terms of the time taken to obtain plan approval. A similar experience has been noted for Canada Mortgage and Housing Corporation lands in Ottawa.

However, in terms of attracting new housing, the land-bank in Red Deer has been successful in overcoming buyer resistance to the unattractive north sector of the city by means of its pricing policy (Watson, 1967, p. 192).

Land-banking is beneficial only if land is acquired at a reasonable cost. Expropriating property for public land banks has resulted in paying inflated prices for land that may not be developed for several years. The carrying costs for public land-banks are not significantly lower than private land-banks.

To sum up, land-banking is a useful land supply management instrument to the government, if it can be operated efficiently and if it is used to supply the land requirements of the portion of the market that is not adequately met by the private market viz. social housing.

8.0 CONCLUSION

In conclusion, the following observations are made on the needs of the public sector to achieve a well-managed land supply management system based on the use of the attending land supply management instruments. The underlying question is what does it mean for the public sector to make good land management supply decisions or - in production terms - good inventory decisions?

Based on the foregoing, it may be concluded that good land inventory decisions for the municipality means:

- supplying land at an optimal level to minimize carrying costs; and

- suppling land at adequate levels to reduce market concentration (market as a whole and submarkets).

Minimizing Carrying Costs

Carrying charges for the municipality are the costs of providing trunk servicing for future development. Since these costs are only recouped when subdivision plans are approved and registered, carrying charges would be significant for municipalities which hold large inventories.

In the 1970's, when growth was rapid and demand for serviced land was high, there was the concern that serviced land may not be supplied in

sufficient quantities to meet the demand. Municipalities were increasingly criticized for constraining supply as a result of poor planning and restrictive regulatory land supply controls. Without much consideration for the need for maintaining optimal levels to minimize costs, municipalities undertook extensive infrastructure developments. As long as the growth momentum was maintained and the rate of consumption was high, the inventories of five years supply did not appear to be large. Besides, it was unclear what the "optimal level" really was. It was perhaps the attitude that it was better to have more than less that prompted decision-makers to install as many services as they could obtain financing for. As a result, the services stand grossly underused. For example, in Durham, Ontario, a $9.4 million sewage treatment plant in Bowmanville and a $7.8 million water plant in Whitby sit idle (Daily Commercial News, February 18, 1982).

In view of the high carrying costs and need for the municipality to demonstrate that it is attempting to implement sound management decisions in land supply and not restrict supply, there is a need for more definitive research to ascertain optimal land inventory levels.

Spurr (1978) and Unsoy (1982) have initiated exploratory work in this direction. If research would be undertaken for more cities and over longer time periods (covering periods of high and low demand), a greater understanding of the optimality of land supply would be achieved.

With an optimal supply level ascertained in terms of years of supply, for example, municipalities would have a firmer basis for making inventory decisions on infrastructure planning and development.

Reducing Market Concentration

To maximize opportunities and choice for the consumer and to moderate price increases, the municipality has to ensure that market concentration does not exist not only at the municipal level but also at the subregional level.

Numerous studies including The Federal/Provincial Task Force on the Supply and Price of Serviced Land have concluded that there is no evidence of concentration in the land market. However, Gunter has pointed out that there were methodological shortcomings in the evidence provided by the task force in support of the conclusion and that market concentration exists at the subregional level (Gunter, 1983). His observation is confirmed in Unsoy's (1982) study of the land market in Kitchener between 1967 and 1977 which revealed periods where there was evidence of the concentration at the subregional level. The fact that 32 percent of municipalities use lot inventory surveys to assess lot supply by sub-region also suggests that municipalities are aware of the importance of subregional market trends.

It is argued, therefore, that it is not sufficient to be satisfied with the existence of several developers in the market, but that it is necessary to analyse for market power at a subregional level as well.

Application of Instruments

With an optimal level of land supply defined for the various inventories of land in the land development process, the municipality will be able to make better management decisions in the planning and operation of its capital works program and minimize carrying costs.

Awareness of the market situation will guide the municipality in making subdivision approval decisions aimed at reducing market concentration. However, in order for these planning and regulatory functions to accomplish their respective objectives, there is a need for an effective monitoring system that will provide the municipality with the necessary supply data.

A monitoring feature that has been found lacking as an input to supply management decisions is the monitoring of land prices. While the fluctuation in land prices always reflects adequacy of supply, it is a useful indicator of market trends. Although some municipalities are known to purchase land transaction from Teela[5], the information has not been systematically analysed by subregions to provide an indication of lot price changes.

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5 Teela Market Surveys, Toronto, publishes records of every land transaction for selected urban municipalities.

With the availability of lot prices data as well as lot supply data, the municipality would be better equipped in its land supply management system. Should their analysis prove that there is market concentration and that the planning and regulatory powers are inadequate to promote the provision of moderate priced housing, the municipality can directly provide housing through a public land development program.

Therefore, the basis of a well managed land supply process is an effective land supply monitoring system that will provide the necessary data for land supply decisions.

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APPENDIX A-1

SURVEY OF THE USE OF MUNICIPAL LOT INVENTORIES
FOR RESIDENTIAL LAND SUPPLY MANAGEMENT

English Version

BIN 28561-4

(Aussi disponible en français)

SURVEY OF THE USE OF MUNICIPAL LOT INVENTORIES FOR RESIDENTIAL LAND SUPPLY MANAGEMENT

This survey is being mailed to the Directors of Planning of all Canadian municipalities with populations over 50 000. Its purpose is to determine the extent to which municipalities maintain regular records of residential land and lots at various stages of the urban land supply process, including planning stages, subdivision approval and development stages. In this survey, "inventory" means a record or monitor of all land or lots in the supply process - not merely of those lands owned by the municipality for development purposes.

The survey forms part of a larger project initiated by the Research Division of Canada Mortgage and Housing Corporation to examine current municipal land supply management practices in Canada. The goal of the overall project is to contribute to the understanding of municipal capabilities to optimize public investment in the production of residential land. In an era of changing demand, it is intended that the project will consolidate and disseminate knowledge about current practices and techniques used in the management of the urban land supply process.

Municipality: _____

Population: _____ (1981 Census or more recent)

Name of Respondent: _____

Position: _____

Telephone Number: (____) _____

SURVEY QUESTIONNAIRE

1. Does your municipality conduct an inventory of raw land in potential residential development areas?

☐ YES

a) What year did it start? 19____

b) How often is it updated?

- regularly (monthly, quarterly, etc.) _____
- irregularly (give dates of last 4 updates)

_____, _____, _____, _____

☐ NO

c) Do you propose to conduct an inventory in the future?

☐ YES ☐ NO

2 Does your municipality conduct an inventory of residential lots or sites for multiple housing, in subdivisions to be developed?

☐ YES ☐ NO

IF YOU ANSWERED "YES" TO QUESTION 2, COMPLETE PART I FOLLOWING.
IF YOU ANSWERED "NO", GO DIRECTLY TO PART II (PAGE 5), QUESTION 13.

PART I: INVENTORIES OF RESIDENTIAL SUBDIVISION DEVELOPMENT LOTS

3. What was the first year monitored by the lot inventory? 19____

4. Are the lots categorized by their stage of development?

☐ YES ☐ NO, **GO TO QUESTION 5**

If response is "YES", please check each category which is reported separately.

Development Stages

☐ lots/units in subdivision plans under development application

☐ lots/units approved for development

☐ registered, unserviced lots/units

☐ registered, serviced lots/units

☐ lots/units under construction

☐ other (please elaborate) _____

_____

_____

5. Are the lots categorized by the type of housing unit for which they are intended/zoned?

☐ YES ☐ NO, **GO TO QUESTION 6**

If response is "YES", please check the type of housing classification which is most similiar to the one used by your municipality. (If none of these is similiar to your classifications, please describe your main classifications in "other").

Type of Housing Classification

☐ very basic (e.g. High, Medium, Low Density)

☐ CMHC Standard (e.g. single, semi, row, apartment)

☐ zoning categories (e.g. R1, R2, R3, etc.)

☐ more elaborate system (e.g. singles at 9.1m (30'), 12.2m (40'), 13.7m (45'), etc. frontages)

☐ other (please elaborate) _____

_____

_____

6. How frequently are reports from the inventory

	a) Produced for internal use?	b) Made available to the public?
not at all	_____	_____
regularly (times) per three years)	_____	_____
irregular (give dates of last four reports)	_____	_____
	_____	_____

7. How frequently is the inventory updated?

☐ continually?

☐ periodically? - regular (times per 3 years) _____
- irregular (give dates of last 4 updates) _____, _____, _____, _____

8. Is the lot inventory used to assist in subdivision approval decisions by:

(a) assessing the inventory of undeveloped lots against recent absorption rates.

☐ YES ☐ NO

(b) assessing the inventory of undeveloped lots in the same subregional sector as the proposed subdivision, against sectoral absorption rates.

☐ YES ☐ NO

(c) assessing the inventory of undeveloped lots of the type in the proposed subdivision, against recent absorption of that lot type.

☐ YES ☐ NO

(d) assessing the inventory and absorption of the particular lot type, in the particular subregion.

☐ YES ☐ NO

(e) other supply assessments (please outline briefly).

_____
_____
_____

9. Is the lot inventory used to assist in infrastructure planning by:

(a) assessing subregional patterns in the rates at which development areas are built up.

☐ YES ☐ NO

(b) projecting future take-up of services for the entire region

☐ YES ☐ NO

(c) projecting future take-up of services for various subregional sectors

☐ YES ☐ NO

(d) other servicing assessments (please outline briefly)

10. Is the lot inventory used to identify bottlenecks or shortages within the subdivision approval process by:

(a) a "flow-through" analysis of the take-up of lots through the various stages recorded in the inventory.

☐ YES ☐ NO

(b) a "flow-through" analysis, as in a), of the main subregional growth areas.

☐ YES ☐ NO

(c) an assessment of the quantity of lots in each stage, against "rules of thumb" for adequacy.

☐ YES ☐ NO

(d) an assessment of the quantities, as in c), disaggregated to the main subregional growth areas.

☐ YES ☐ NO

(e) other process assessments (please outline briefly):

_____

_____

_____

11. Can you describe other uses which you make of the inventory, in addition to those we have identified in Questions 8, 9, and 10 preceding?

_____

_____

_____

12. Do local developers make use of the data in your lot inventory?

a) to prepare briefs about the approval process ☐ YES ☐ NO

b) to support applications for zoning change ☐ YES ☐ NO

c) to determine what is selling best ☐ YES ☐ NO

d) to identify their competition ☐ YES ☐ NO

GO ON TO PART III, QUESTION 18.

PART II: PLANS FOR FUTURE INVENTORIES

13. Is your municipality planning to begin conducting a lot inventory?

☐ YES ☐ NO

If response is "NO", go to Question 16. If "YES", please answer 14 and 15.

14. What would be the purpose(s) of your lot inventory?

a) assisting in subdivision approval decisions ☐ YES ☐ NO

b) assisting in infrastructure planning ☐ YES ☐ NO

c) identifying bottlenecks or shortages in subdivision processing ☐ YES ☐ NO

d) assisting local industry in planning and marketing ☐ YES ☐ NO

e) other purposes (please outline briefly):

_____

_____

_____

15. How would the lot inventory be categorized?

(a) Development Stage Categories:

1. Lots in proposed subdivisions ☐ YES ☐ NO
2. Lots approved for development ☐ YES ☐ NO
3. Registered lots, unserviced ☐ YES ☐ NO
4. Registered lots, serviced ☐ YES ☐ NO
5. Lots under construction ☐ YES ☐ NO
6. Other (please elaborate)

_____

_____

_____

_____

(b) Housing Type Classifications: **Please check the type of housing classification which is most similar to the one intended for your municipality**

1. Very basic (high, medium, low) ☐ YES ☐ NO
2. CMHC standard (single, semi, row, apartment) ☐ YES ☐ NO
3. Zoning Categories (R1, R2, R3 etc.) ☐ YES ☐ NO
4. More elaborate (singles at 9.1 m (30'), 12.2 m (40'), etc. frontages) ☐ YES ☐ NO
5. Other (please elaborate)

_____
_____
_____
_____

GO ON TO PART III, QUESTION 18.

16. Would you use an inventory of lots in your municipality, if one were available?

☐ YES ☐ NO

17. If your municipality is not intending to conduct a lot inventory, could you briefly explain why not?

_____
_____
_____
_____

PART III: CONCLUSION

18. Are you interested in being informed about the results of this survey?

☐ YES ☐ NO

If "YES", please provide your mailing address.

Name: _____

Address: _____

_____

_____

19. If you have any comments on the survey, or on other aspects of land supply monitoring, please elaborate below.

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For enquiries, please contact:
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Research Division
Canada Mortgage and Housing Corporation
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APPENDIX A-2

ENQUÊTE SUR L'USAGE DES STOCKS DE TERRAINS DEVELOPPABLES DANS LES MUNICIPALITES POUR LA REGULATION DE L'OFFRE DE TERRAINS DESTINES A LA CONSTRUCTION RESIDENTIELLE

French Version

FRP 285161-4

(Also available in English)

ENQUÊTE SUR L'USAGE DES STOCKS DE TERRAINS DÉVELOPPABLES DANS LES MUNICIPALITÉS POUR LA RÉGULATION DE L'OFFRE DE TERRAINS DESTINÉS À LA CONSTRUCTION RÉSIDENTIELLE

La présente enquête s'étend aux directeurs d'urbanisme, de toutes les municipalités du Canada qui comptent plus de 50 000 habitants. Elle a pour but de déterminer dans quelle mesure les municipalités consignent régulièrement dans leurs registres les terrains et lots résidentiels disponibles, au fur et à mesure du processus d'aménagement foncier, notamment aux stades de la planification, de l'approbation des lotissements et de phases de développement. Aux fins de l'enquête, le terme "inventaire" englobe la totalité des terrains ou lots qui entrent dans le processus d'offre des terrains et ne se limite pas uniquement aux terrains que détient la municipalité à des fins de développement urbain.

Cette enquête fait partie d'un plus vaste projet entrepris par la Société canadienne d'hypothèques et de logement et dont l'objet est d'examiner à fond les modes de régulation de l'offre de terrains dans les municipalités du Canada. Dans cette entreprise, notre objectif ultime est de permettre aux municipalités de favoriser le meilleur usage possible des deniers publics qui servent à l'aménagement des terrains résidentiels, en période de fluctuation de la demande. Notre intention est de regrouper toutes les connaissances à ce jour, en ce qui concerne les méthodes et techniques de régulation de l'offre de terrains.

Municipalité: _____

Population: _____ (Recensement de 1981, ou plus récent)

Nom du répondant: _____

Poste: _____

Téléphone: (____) _____

QUESTIONNAIRE

1. Votre municipalité, tient-elle l'inventaire des terrains vacants situées dans des secteurs où l'expansion résidentielle est possible?

☐ OUI

a) Depuis quand? 19____

b) A quelle fréquence est-il mis à jour?

- régulièrement (mensuellement, trimestriellement, etc.) _____
- irrégulièrement (donner les dates des 4 dernières mises à jour)

_____, _____, _____, _____

☐ NON

c) Vous proposez-vous d'en faire l'inventaire dans l'avenir?

☐ OUI ☐ NON

2. Votre municipalité tient-elle l'inventaire des lots ou emplacements résidentiels situes dans des lotissements destinés à être utilisés pour construction des logements collectifs?

☐ OUI ☐ NON

DANS L'AFFIRMATIVE, RÉPONDRE AUX QUESTIONS DE LA PARTIE I CI-DESSOUS. SINON, PASSER DIRECTEMENT À LA QUESTION 13, PARTIE II PAGE 5.

PARTIE I: INVENTAIRE DES STOCKS DE LOTS RÉSIDENTIELS

3. **Quelle a été la première année de l'inventaire? 19____**

4. Les lots, sont-ils catégorisés selon le stade de l'aménagement?

☐ OUI ☐ NON, **PASSER À LA QUESTION 5**

Dans l'affirmative, marquer chaque catégorie distincte.

Stades de développement

☐ lots/terrains en voie de lotissement

☐ lotissements cadastrés mais non-developpés

☐ lots/terrains cadastrés mais non-desservis

☐ lots/terrains cadastrés et desservis

☐ lots/terrains en construction

☐ autres (préciser)_____

_____

_____

5A. Les lots, sont-ils catégorisés par types d'habitation auxquels ils sont destinés ou zonés?

☐ OUI ☐ NON, **PASSER À LA QUESTION 6**

Dans l'affirmative, marquez le type de classification qui est la plus semblable à celle qui est utilisée (si aucune de ces classifications n'y ressemble, veuillez alors décrire vos principales classifications sous la rubrique: "autres").

Type de classification utilisé

☐ très générale (par ex. forte, moyenne, faible densité)

☐ SCHL (par ex. individuelle, jumélée, en rangée, immeuble d'appartements)

☐ catégories de zonage (par ex. R1, R2, R3, etc.)

☐ plus détaillée (par ex. individuelles à front de terrain de 9,1m (30 pi), 12,2 m (40 pi), 13,7 m (45 pi), etc.

☐ autres (préciser)_____

_____

_____

5B. Quel type de système d'enregistrement est utilisé pour l'inventaire?

☐ système informatique

☐ chiffres et graphiques

☐ cartes seulements

☐ autres ou combinaisons (veuillez décrire brièvement):_____

_____

_____

6 A quelle fréquence les rapports d'inventaires sont-ils

	a) produit pour l'usage interne?	b) mis à la disposition du public?
jamais	_____	_____
régulièrement (nombre de fois par période de trois ans)	_____	_____
irrégulièrement (donner les dates des 4 derniers rapports)	_____	_____
	_____	_____

7. A quelle fréquence l'inventaires est-il mis à jour?

☐ d'une façon continue?

☐ périodiquement? - régulièrement (nombre de fois par période de 3 ans) _____
- irrégulièrement (donner la date des 4 dernières mises à jour) _____ . _____ . _____ _____

8. Est-ce que l'inventaire du stock des lots sert aux décisions d'approbation de lotissement, au moyen de:

(a) À L'ÉCHELLE DE LA MUNICIPALITÉ OU DE LA RÉGION

(i) d'une comparaison entre le stock actuel des lots disponibles, et le rythme d'utilisation récente des lots.

☐ OUI ☐ NON

(ii) d'une comparaison entre le stock actuel des lots non-aménagés destinés au même type d'habitations que celui proposé pour le lotissement, et le rythme récent d'utilisation des lots destinés à ce type d'habitation.

☐ OUI ☐ NON

(b) À L'ÉCHELLE DU SECTEUR OU EST SITUÉ LE LOTISSEMENT PROPOSÉ

(i) d'une comparaison entre le stock actuel des lots disponibles, et le rythme d'utilisation récente des lots.

☐ OUI ☐ NON

(ii) d'une comparaison entre le stock actuel des lots non-aménagés destinés au même type d'habitations que celui proposé pour le lotissement, et le rythme récent d'utilisation des lots destinés à ce type d'habitation

☐ OUI ☐ NON

(c) ☐ autres modes d'estimation de l'offre (veuillez décrire brièvement)

_____
_____
_____

9. Est-ce que l'inventaire des lots sert à la planification des infrastructures en:

   (a) estimant le rythme de dévellopement dans le secteur, à bâtir sur les terrains destinés à l'aménagement?

   ☐ OUI ☐ NON

   (b) estimant quelles seront les tendances futures d'utilisation des services dans les municipalités ou la région?

   ☐ OUI ☐ NON

   (c) estimant quelles seront les tendances futures d'utilisation des services de divers secteurs?

   ☐ OUI ☐ NON

   (d) autres estimations relatives aux tendances d'utilisation des services (veuillez décrire brièvement).

   _____
   _____
   _____
   _____

10. L'inventaire des lots, sert-il à déceler les goulots d'étranglement ou lacunes qui interviennent dans le processus d'approbation des lotissements en vous permettant de:

   (a) procéder, au fur et à mesure des différents stades de l'inventaire, à l'analyse systématique du rythme d'utilisation des lots?

   ☐ OUI ☐ NON

   (b) procéder à l'analyse systématique, comme à l'alinéa a), des principales zones de croissances?

   ☐ OUI ☐ NON

   (c) prendre en considération le nombre de lots, à chaque stade de l'inventaire, plutôt que de procéder par instinct?

   ☐ OUI ☐ NON

   (d) prendre en considération le nombre de lots, comme à l'alinéa c), réparti entre les principales zones de croissance?

   ☐ OUI ☐ NON

   (e) autres considérations au chapitre du processus d'approbation des lotissements (veuillez décrire brièvement):

   _____
   _____
   _____

11. Pouvez-vous décrire les autres utilisations que vous faites de l'inventaire, en plus de celles suggérées aux questions 8, 9, et 10?

_____

_____

_____

12. Les promoteurs locaux, utilisent-ils votre inventaire des lots pour:

(a) préparer des mémoires pour critiquer le processus d'approbation? ☐ OUI ☐ NON

(b) appuyer les demandes de modification de zonage? ☐ OUI ☐ NON

(c) déterminer ce qui se vend le mieux? ☐ OUI ☐ NON

(d) identifier leurs compétiteurs? ☐ OUI ☐ NON

PASSER À LA QUESTION 18, PARTIE III.

PARTIE II: PROJETS D'INVENTAIRE

13. Votre municipalité, se propose-t-elle d'entreprendre un inventaire du stock des lots résidentiels?

☐ OUI ☐ NON

Si la réponse est "non", passer à la question 16. Si la réponse est "oui", répondre aux questions 14 et 15.

14. À quelle fin servira votre inventaire?

a) aider à la prise de décisions quant à l'approbation des lotissements ☐ OUI ☐ NON
b) aider à la planification des infrastructures ☐ OUI ☐ NON
c) déceler les entraves et les lacunes dans le processus de lotissement ☐ OUI ☐ NON
d) conseiller l'industrie locale en matière de planification et de commercialisation ☐ OUI ☐ NON
e) autres fins (expliquer brièvement)

_____
_____
_____

15. Comment les lots seront-ils catégorisés aux fins de l'inventaire?

(a) Catégories fondées sur le stade d'aménagement

1. Lots/terrains en voie de lotissement ☐ OUI ☐ NON
2. Lots/terrains cadastrés mais non-developpés ☐ OUI ☐ NON
3. Lots/terrains cadastrés mais non-desservis ☐ OUI ☐ NON
4. Lots/terrains cadastrés et desservis ☐ OUI ☐ NON
5. Lots/terrains en construction ☐ OUI ☐ NON
6. Autres (préciser)

_____
_____
_____
_____

(b) catégories fondées sur le type d'habitation: **Indiquer s'il-vous-plait le mode de classement qui se rapproche le plus de celui qui est utilisé dans votre municipalité.**

1. Très général (ex. forte, moyenne, faible densité ☐ OUI ☐ NON
2. SCHL (ex. individuelle, jumelée, en rangée, immeuble d'appartements) ☐ OUI ☐ NON
3. Catégories de zonage (R1, R2, R3, etc.) ☐ OUI ☐ NON
4. Plus détaillé (ex. individuelles à front de terrain de 9,1m (30 pi), 12,2m (40 pi.), 13,7m (45 pi), etc.) ☐ OUI ☐ NON
5. Autres (préciser)

_____
_____
_____
_____

(c) Quel type de système d'enregistrement sera utilisé pour l'inventaire?

☐ système informatique
☐ chiffres et graphiques
☐ cartes seulements
☐ autres ou combinaisons (veuillez décrire brièvement):

_____
_____
_____
_____

PASSER À LA QUESTION 18, PARTIE III.

16. S'il y avait un inventaire du stock des lots résidentiels dans votre municipalité, l'utiliseriez-vous?

☐ OUI ☐ NON

17. Si votre municipalité n'a pas l'intention de dresser l'inventaire du stock de lots, pouvez-vous en donner brièvement le pourquoi?

_____
_____
_____
_____

PARTIE III: CONCLUSION

18. Êtes-vous interessé à connaître les résultats de cette enquête?

☐ OUI ☐ NON

Dans l'affirmative, veuillez donner votre adresse postale.

Nom: _____

Adresse: _____
_____
_____

19. Si vous avez des observations à faire au sujet de la présente enquête, ou à propos d'autres aspects des relevés de l'offre de terrains, veuillez les noter ci-dessous.

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Demandes de renseignements:

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APPENDIX A-3

LIST OF RESPONDENTS BY PROVINCE

Newfoundland

City of St. John's
St. John's Metropolitan Area Board

New Brunswick

City of Saint John

Nova Scotia

City of Dartmouth
City of Halifax
County of Halifax
Metropolitan Area Planning Commission

Quebec

Ville de Beauport
Ville de Charlesbourg
Ville de Chicoutimi
Ville de Gatineau
Ville de Hull
Ville de Jonquière
Ville de Laval
Ville de Montreal
Ville de Montreal Nord
Communauté Urbaine de Montréal
Communauté Regionale de l'Outaouais
Ville de Québec
Communauté Urbaine de Quebec
Ville de Saint-Laurent
Ville de Saint-Leonard
Ville de Sainte-Foy
Ville de Sherbrooke
Ville de Verdun

Ontario

City of Brampton
City of Brantford
City of Burlington
City of Cambridge
Regional Municipality of Durham
Borough of East York

City of Etobicoke
City of Gloucester
City of Guelph
Regional Municipality of Haldimond-Norfolk
Regional Municipality of Halton
City of Hamilton
Regional Municipality of Hamilton-Wentworth
City of Kingston
City of Kitchener
City of London
Town of Markham
Municipality of Metropolitan Toronto
City of Mississauga
Regional Municipality of Niagara
City of Niagara Falls
City of North Bay
City of North York
Town of Oakville
City of Oshawa
City of Ottawa
Regional Municipality of Ottawa-Carleton
Regional Municipality of Peel
City of Peterborough
Town of Pickering
City of Sarnia
City of Scarborough
City of St. Catharines
Regional Municipality of Sudbury
City of Thunder Bay
City of Toronto
City of Waterloo
Regional Municipality of Waterloo
City of Windsor
City of York
Regional Municipality of York

Manitoba

City of Winnipeg

Saskatchewan

City of Regina
City of Saskatoon

Alberta

City of Calgary
City of Edmonton
Edmonton Metropolitan Region
City of Lethbridge
City of Red Deer

British Columbia

District of Burnaby
Capital Regional District
District of Coquitlam
Corporation of Delta
Greater Vancouver Regional District
City of Kamloops
City of Kelowna
District of North Vancouver
City of Prince George
Township of Richmond
District of Saanich
District of Surrey
City of Victoria